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THE AMERICAN
JOURNAL OF PHARMACY

VOL. 98 NOVEMBER, 1926 NO. 11

EDITORIAL

THE METRIC SYSTEM AGAIN

IN SPITE of a formidable and inexplicable propaganda originating somewhere on the Pacific slopes, the metric system in America seems doomed to stay an orphan. This country appears about as apathetic towards its adoption as it is toward other "entangling alliances."

For years scientific journals have carried in their columns review after review of the great and special advantages of the system of tens over the more cumbersome English units. And no doubt much of this information is pertinent and accurate.

It is pointed out that the British Empire, while not adopting the metric measure as such at least adopted its principle of commensurability when it framed its Imperial system of measures.

But America continues to wallow in a mystic maze of measures —with its several ounces and pounds—a weird combination of binary divisions and fractions and duo-decimals.

Our systems of measurement have been in great part discarded by the English, who devised them, yet we continue with their handicaps.

Only the schoolboy and specialist can recite with any accuracy the common English tables of linear and square measure. The man on the street has long since forgotten them.

But the metric system, however, once learned, with its simple related units in decimal continuity—cannot be readily forgotten, anymore than our simple system of coinage. So it cannot be simply a matter of the relative merits of these two systems—for in theory the metric seems vastly superior.

Yet there must be very fundamental reasons why we persist with our present fashion. Truly enough we are built on a decimal plan

and primitive man must have counted his friends and his flocks in a decimal way—for his fingers and toes were his standards.

But later in the evolution of his measuring schemes he turned to the system of dozens, and this he undoubtedly did because it must have been more convenient and practical.

And from the standpoint of practicability our progenitors were saner and surer than us. Their art was in knowing how and not why.

Perhaps one of the reasons why practical men continue to believe in the system of dozens and sixteens, is because they know full well that practice and not theory evolved them.

An article which recently appeared in the *Journal of the Franklin Institute* (November, 1926, *686*), fairly well represents the attitude of those who, while admitting some special merits of the metric system, yet oppose, on practical grounds its compulsory adoption by the country. According to this writer there will always be a conflict between practice and theory so long as theorists attempt to enforce standards which practical men abhor. There is nothing in the metric system, he claims, comparable in clearness and adaptability to general use to the subdivisions on an ordinary two-foot rule. Binary subdivisions produce a scale of unqualified legibility, while decimal subdivision becomes more and more difficult to decipher.

Quoted by this writer Mr. Wilfred Lewis tells of an experience of his son in France during the war in which he found that French carpenters were not using metres with subdivisions at all, but had what appeared to him to be an English two-foot rule graduated in the same way as our rules, thus indicating their preference for a system based on units of convenient size and having binary divisions.

He continues:

> "Now that there is a renewed agitation for the compulsory adoption of the metric system in this country, it may be well to note some reasons why it is believed that a change would be not be advisable:
>
> Because of the importance of the preservation of our established basic standards.
>
> Because of the value of the unity we now have. One system only in general use.
>
> Because of the advantages of the present system with binary divisions and units capable of more varied divisions as compared with a sytem based on ten.
>
> Because of the importance of retaining compound units such as bushels per acre; pounds per square inch; tons per square foot; ton-miles; board-feet, etc.

Because of the preponderance of our commerce on the basis of the present system, the advantage of which would be lost if a change were made.

Because of the reference to weights and measures in our literature, general as well as technical, permeated as it is now with our present standards. This includes the importance of having a system of weights and measures accord with the language, as does our present system with its simple single syllable words.

Because of the heavy burden, involving great cost, a change would load on manufacturers and on the people as a whole.

Because of the persistence of old units confusing them with the new and requiring a knowledge of both for many generations after a change has been made.

Because of the more convenient units of our established system suited to common use, there being no units in the metric system according with our inch, foot, pound, etc.

Because when a decimal system is desired for calculation, the present system can be and is conveniently decimalized. For example, for larger measurements 10, 100 or 1000 feet, and in the use by surveyors of 10th and 100th of a foot, while for finer measurements in the machine shops 100ths and 1000ths of an inch are in everyday use.

Because our land surveys and plats would be seriously affected by a change, in fact to such an extent that a change would be practically prohibitive.

Because the workman using measurements would, if required to change, lose a degree of the skill he had acquired by familiarity with our convenient measures; for example, the two-foot rule and its divisions; the inch and its decimals.

Because the workman would have to invest in a new kit of tools.

Because the tradesman would have to replace his weighing and measuring appliances, for example, every grocer, every post office and all gasoline filling stations throughout the country."

And in this group of "becauses" is sufficient warrant for those of us who have been advocating the general adoption of the metric system, to pause and reflect awhile. That it seems to fit snugly into our own little specialty must not cause us to lose our sense of perspective. Indeed, compulsory adoption throughout the land may mean an alliance far more entangling and confusing than ever it was expected to be.

IVOR GRIFFITH.

ORIGINAL ARTICLES

EPIDEMICS—MAN'S MOST DEADLY ENEMY*

By Louis Gershenfeld, Ph. M., B. Sc., P. D.

Professor of Bacteriology and Hygiene, Philadelphia College of Pharmacy and Science

IF I VENTURE once more to speak on a topic, which I may have briefly touched upon at a previous occasion, it is because it is our duty to help form a more enlightened public opinion, and to guide and quicken the awakened interest in science.

Prof. Louis Gershenfeld

Science, as defined briefly by Dr. David Starr Jordan, is "organized human knowledge" or "human experience tested and set in order." By introducing the best outlook of science into life, the ordinary happenings of our everyday routine will be filled with new beauty and wonder; and we will know not only how to make a living, but what is more important, we shall know how to live. There are many who do not know whether to regard science as an amusing toy for the scientist or as an indispensable factor in modern civilization.

The old saying "that what one doesn't know, one doesn't worry about" should not be practiced these days. Past experience has taught that the acquisition of knowledge is the best way to do away with worries, mistakes and various ills. The possession of knowledge gives one a means of looking forward and preparing to meet conditions that the future will produce. The difference between knowing and not knowing depends not only upon the method of presentation of the particular subject, but also upon the method of approach by those eager to learn. "We learn to do only by doing" is also best practiced voluntarily, rather than by compulsion.

There is a familiar axiom, which was expressed four centuries

*One of a Series of Popular Science Lectures given by the members of the Faculty of the Philadelphia College of Pharmacy and Science, 1926-1927 season.

before Christ: "Life is short and art is long; the occasion fleeting; the experience fallacious, and judgment difficult. The physician must not only be prepared to do what is right himself, but also to make the patients, the attendants and externals cooperate." These lines can be repeated on behalf of the public health worker as being just as opportune today, even though we are living in an amazing and more enlightened epoch. Time has not altered the value of this advice from a voice 2400 years ago. Despite centuries of philosophical guidance, these words should be taken to heart by those living in this day of material wonders, and who desire to get much out of this life before the brief span closes.

Are you one of those who has become accustomed to the idea that epidemics are inevitable visitations? Do you for a moment pause to consider what are the conditions that must be fulfilled prior to the coming of a plague and are you ready to do your share in case of an approach of an epidemic? You may not be able to postpone death unless you possess such knowledge. If epidemics had not been controlled during the war as effectively as they were, there might have been a different story to relate. It is no accident that one child develops scarlet fever and the other does not; or that one develops a mild attack, and the other a severe attack of a disease, even though both were exposed to that disease under identical conditions. You provide yourself with an umbrella to protect you against the rain, snow implements to get rid of the snow; you vote for the construction and upkeep of battleships, which, with their officers and crews of many thousands, require a stupendous outlay of money—far, far in excess of that allotted for the introduction and upkeep of sanitary conditions, and yet you are incurably optimistic, and only take account of an epidemic disaster when it actually arrives. It is about time that man depended more upon his reasoning powers than upon his emotions.

It may seem cheaper at the beginning to neglect proper sanitary control (because of the initial outlay of money). But is it cheaper in the long run? Let the health authorities ask for a few thousand dollars to avert the approach of an epidemic, and in many cases the appropriation is denied them. Narrow personal prejudices at times becloud an issue, and defeat is the result. But after the arrival of the epidemic, there is a different picture and story. Money is made available in amounts many times greater than the sum required before the appearance of the disaster.

Disarmament of the Health Forces Must Never Occur

The loss of life from wars has generally been considered a necessary sacrifice made in the cause of human freedom. The upkeep of armies and navies is supposed to keep these losses down to a minimum. For those lives lost by epidemics, the average individual has assumed a somewhat peculiar attitude, one that is largely tinged with helplessness and fatalism. By introducing methods of modern sanitary science and paying for their upkeep just as we support our army and navy, a great stride will be made in solving the problem of wiping out epidemics, or at least in keeping the loss of life down to a minimum. Sanitarians are hampered by lack of funds and equipment. As soon as their educational methods and plans are placed on a battleship basis as a part of our daily routine, and individuals display a more serious appreciation and an intelligent cooperative spirit, there will be an even greater saving in the lives of men, with the resultant improvement in general health. This in turn will mean greater happiness and happiness will beget longer life for all.

Is it possible to evaluate the work of the sanitarians as a distinct contribution to human progress? Have you as layman realized that in trying to advance sanitary science, the sanitarian has no selfish motive? In reality, if the time ever comes when sanitary knowledge will be practiced to its fullest extent, there will be less opportunity for the sanitarian to receive any worthwhile financial return for himself.

Would the Panama Canal have been built if not for the sanitarians? Who made Cuba, Central Africa and the many tropical countries habitable? The same organization, affected by sanitarians to deal with the foregoing problems, is always capable of dealing with disease, if the means will be made available. Yes, it is the man of science who ultimately is to decide the fate of a nation.

From one to two billion dollars are spent annually to advertise commodities. This money does not make the products any better. But if spent wisely, you are led and made to think and feel, that the commodity is good, and then and only then does the product actually become good.

Scientists unfortunately do not have at their disposal the financial means for advertising, or in other words to get you in the proper state of mind to think about their problems, introduced for your benefit. Also you who buy the advertised commodity eventually pay

for the advertisement of such commodity. The scientist, however, has no means of collecting for any advertisement. Commercial advertisement is introduced primarily with the hope of a financial return being received by the producers, while the consumer's interest is in reality only of secondary consideration. The opposite is the case in the presentation of scientific information to the general public by the scientists.

Advertising Health

We need more advertising and the spreading of literature giving medical, sanitary and scientific facts impartially. The many beneficial societies and insurance companies can and should act as distributors of such information. Instead we have patent medicine, food and other concerns presenting in advertisement scientific sounding facts, which are objectionable and misleading.

Flitcraft's Compend for 1926 reports that sixty-three of the prominent life insurance companies have admitted assets (as of January 1, 1926) of over eleven billion dollars. Add to that the many companies not rated as prominent, we can easily place the estimated figure close to the fifteen billion mark. "New Paid For" business during 1925 amounts to twelve and one-half billion dollars. Add to that business to smaller companies, and the total will be close to fifteen billion. Premiums on this are approximately $600,000,000. The Thrift Publishing Company of New York City publishes a chart, according to which 251 life insurance companies had a premium income during 1925 of approximately two and a half billion dollars. And this does not cover all of them. There are no statistics available as to the expenditure of dues solely for beneficial organizations. But at a glance, you can readily see that many, many billions of dollars are spent annually to protect and benefit financially the dear ones of the deceased.

Compare this with a recent statement that approximately one billion dollars a year is spent in this country on medicines, doctors and hospital maintenance. Half of this expenditure was for prescriptions and patent medicines (and most of the half for patent medicines), while the greater portion of the whole was for the treatment and not for the prevention of ailments.

Insurance after all is not so much a protection for the individual as for the dear ones of that individual. And that same insurance is sold not really for the humanitarian thought of benefiting

the individual, but because a persistent agent, strongly armed with perseverance wants his commission of the premiums (which in the early years of the policy are very high), so that he may live and carry on. Now, I am a firm believer in insurance. I am willing to agree that the dear ones that are financially benefited are also aided to care better for their health. But are the insurance companies, beneficial organizations and other similar bodies contributing to the welfare and health of their own members in the measure, which the facilities at their command make possible? Should it not be the duty of these organizations to do more than aim to protect the financial standing of the immediate relatives of the deceased? An increase in the interest of health, which they may foster, will benefit them financially to an even greater extent, than they receive today through advertisements as carried on by them. I am not unmindful of the great work which some of these beneficial and a few isolated insurance organizations are performing. But I firmly believe, that if these great bodies in a cooperative effort would apply themselves in a spirit of human service to foster a more effective movement for the appreciation of the fundamentals of health and sanitary regulations, they would exhibit much wisdom and make a signal contribution to the whole cause of modern education in matters pertaining to health.

May not our attention be directed momentarily to the efforts of our government and state along these lines? Are they doing as much as they should? Why did they spend the large sums during the great World War and when peace is at hand reduce the allotment expended for the fostering of health education to a small fraction of that expended for the fostering of health education to a small fraction of that expended in those trying days? Any expenditure which may be made is not an expense. It is in reality an investment, greater than any financial return could possibly bring forth. Misery and suffering, avoidable sickness and untimely deaths are diminished, and the savings of lives are the result, if the health officer is not handicapped by a lack of funds.

When we were forced to take stock of our available man-power, there resulted a revelation, which came as a shock—less than half of our best were fit. Does this not show that everyone needs to be conversant with all factors affecting his health? Surely, such conditions are the same during peace as during war. Then why are we allotting an expenditure of only a small fraction of that

which was spent before? Are our authorities realizing their responsibilities? Are we turning our cast iron into rustless steel or leaving it alone to remain cast iron and rust?

Health—Disease

Health may be defined as that condition of the body, in which all the various duties are being performed normally, without disclosure of any discomfort.

Disease, on the other hand, signifies the imperfect functioning of one or more of the bodily organs due to some impairment in the structure. This is revealed by a feeling of discomfort, either in the affected part, or throughout the system in general.

A healthy body then is one, which responds favoraby to environmental influences, in contrast to a diseased body, which does not exhibit adequate responsivity.

Diseases were formerly spoken of as "Contagious or Infectious." The former (Contigere—to touch) included all those diseases, contracted by direct contact with the patient or material obtained from the latter, and not disinfected immediately. Infectious diseases (Inficere—to put in) are those contracted indirectly or through an intermediary. A confusion which is prevalent as to the term to use in the various diseases, has influenced the introduction of more exact terms. These are Communicable or Transmissible—by direct contact (those formerly known as contagious)—by indirect contact (those designated as infectious). Just as all contagious diseases are infectious, so most all of the diseases transmissible by direct contact may be disseminated indirectly through an intermediary.

Example of contagious (transmissible by direct contact) diseases—smallpox, diphtheria, scarlet fever, measles, chickenpox.

Ex-infectious (transmissible by indirect contact) diseases —typhoid fever, dysentery, cholera, etc.

A few isolated cases of a disease occurring occasionally in a particular community is spoken of as an "outbreak" of the disease, or as "Sporadic."

Diseases that are constantly present in certain localities (in small numbers) or are characteristic of a particular area are said to be or spoken of as "Endemic," (En-in, Demos-people).

If a large number of cases of a particular disease occurs at the same time in a given area (being generally prevalent throughout that territory), that disease is said to be "Epidemic," (Epi-on, upon and Demos-people). The exact number of cases which must prevail before a disease can be spoken of as an Epidemic is not definite, ranging from one-tenth per cent. of the population to 1 per cent. in places having a small population.

If an epidemic disease spreads over large areas as an entire country, continent, etc., at once or at about the same time, the disease is then said to be "Pandemic," (Pan-all, Demos-people).

Acute Diseases are those, the symptoms of which appear suddenly, have but a short duration, and possess definite characteristics.

Chronic Diseases begin with misleading symptoms, usually not characteristic, and of such manifestation, as not to be perceptible. The duration is indefinite. The symptoms throughout the disease are irregular and vary. Chronic diseases may be the perpetuation of acute attacks.

In my attempt to cover in detail the most important group of diseases, that are at times the cause of disastrous epidemics, I will confine myself to a consideration of the prevention and control of the sputum, droplet and air-borne infections. Gastro-intestinal diseases (epidemics of typhoid fever and its kin, dysentery and cholera) have been practically eliminated in this country. The so-called deficiency diseases are a thing of the past, and the few that are prevalent are under control. Malaria and other common insect-borne diseases have been conquered and many other diseases, assuming epidemic proportions, except those that I am about to discuss, have been robbed of their terrors.

The Respiratory Diseases

Sanitarians are especially concerned with respiratory infections, for their prevention and control is one of the pressing problems at all times.

Many epidemics, novel in that their exact source is frequently unknown, spread over the country, and reach rather serious proportions in various quarters. Public suspicion may point to certain causes, and it is interesting to observe how the popular mind builds up a clear case of circumstantial evidence against these specific causes. It remains, however, for the sanitarian to make a complete survey.

Every diseased individual in badly infected areas is interviewed and watched. Frequent sanitary inspections of the environment are made. Deductions obtained under such scientific guardianship gives more exact information, as to the source of infection. Sound facts are analyzed and correct interpretations made. The scientist under these conditions not only tries to diagnose the trouble, but endeavors to work out its mysteries and relationships;—how it is propagated and spread, and, if possible, to determine the best means of treatment and prevention. In cities where intensive health saving campaigns have been carried on, there has been a noticeable decrease in fatalities.

What are the sputum, droplet and air-borne diseases, that assume epidemic proportions? They include those diseases in which the infective agent is present in the air (air-borne) or in the secretions of the nose and throat (droplet or sputum-borne). They are influenza, measles, German measles, diphtheria, smallpox, chickenpox, mumps, scarlet fever, whooping cough, cerebro-spinal-meningitis, epidemic or septic sore throat, colds and the sequalae of these diseases.

Let us now consider the direct and indirect factors, that are of importance in the prevention of the spread of these diseases.

Pathogenic (*i. e.*, disease producing) micro-organisms are always lodging on various parts of the body, and still people are not constantly sick. In epidemic diseases, it is also observed, that only a portion of those exposed become infected; and those diseased will show symptoms from mild to the most severe cases. It is therefore evident, that the production of an infection must depend upon influences, other than the mere contact of disease producing micro-organisms with the body. Such influences are regulated and shared by micro-organisms as well as by the host (*i. e.*, the individual upon whom the organisms live).

Concerning the organisms, the first fact that must be considered is that infection depends directly upon the virulency (disease inciting power) of micro-organisms. Don't get the erroneous idea, that all micro-organisms are disease-producing. Also the same species of harmful bacteria may show a marked variancy in disease-producing properties. One of the members may be non-disease producing, while others may possess increasing degrees of energy and pep in their mischief-making. Remember that the bacteria themselves are subject to changes of one kind or another, which, in turn, may affect their virulency, if they possess originally such power of producing disease. Then the number of these disease-producing organisms that

may invade the system will also modify or increase the seriousness of a particular disease. But the most important fact, which must be considered, is the path by which bacteria enter the tissues. Many organisms will only develop and exert their disease-producing properties if they gain entrance to that particular part of the body peculiar to each individual group of bacteria. Such characteristics have resulted in the distinguishing of distinct groups, the most important being the respiratory bacteria (bacteria causing infection of the respiratory tract), and the gastro-intestinal bacteria (organisms causing infection of the gastro-intestinal tract).

Infection therefore takes place as the result of the invasion of the body by disease producing organisms, living in the body tissues, favorable for their existence.

In addition to the individual characteristics of bacteria, the power possessed by them to produce disease depends also upon the nature of the host. A bacterium that is pathogenic for one animal may be harmless to another. The Treponema Pallidum (organism causing syphillis) is non-pathogenic for the commonly observed laboratory animals, but pathogenic for man. Typhoid bacilli fed to man will produce a serious disease, but will produce no effect when fed to cattle.

Other than the previously-mentioned facts, the ability of bacteria to produce disease may be modified by a number of factors, affecting the host, or the body which is attacked. These are known as the predisposing causes. They are conditions which by their influence upon the body predispose individuals to infection. Such conditions are numerous and varied.

The host himself possessing the disease-producing organism in the proper or favorable body tissues may be diseased, producing either a severe infection, confining him to bed, or it may only be a mild attack. Under such conditions, he may go about his routine daily duties. On the other hand, he may be what we know as a "Human carrier." The latter are healthy individuals, who harbor in their system disease-producing bacteria, which may be passed on to others, who because of a lower resistance or vitality, may become diseased.

To lower the incidence of respiratory infections, our main efforts should be aimed at the prevention of the promiscuous transfer of sputum and nasal discharges by the host. The average individual does not understand the danger from the latter and accordingly these secretions are distributed freely and promiscuously. If he was aware of the fact, that the causative agents of all respiratory diseases reside

in these discharges, and that the portal of exit is by means of the same discharges, he would perhaps be more careful, and not distribute them promiscuously.

Promiscuous spitting or expectorating should not be tolerated and should be prohibited.

Avoid loud talking. Droplets of saliva containing the infective agent may thus be transferred from one to another, especially through close contact.

The handkerchief should be employed at all times to "screen the sneeze," to smother the cough, and to receive discharges when blowing the nose. Don't use the hands for screening a sneeze or smothering the cough. Keep your hands and fingers away from your mouth and nose at all times, and avoid soiling your hands with the discharges that may be on the handkerchief. Clean your hands thoroughly after they visit the mouth, etc. Cleansing of the hands should be practiced before one partakes in food. I firmly believe that just as the hand is frequently the transmitting agent in food borne epidemics (typhoid, cholera, etc.), (by contaminating food and drink), the hand is to a far greater degree a big factor directly and indirectly in the spread of respiratory diseases.

Many of our epidemic diseases in their most virulent forms have their sources, and also very likely their permanent homes somewhere within the confines of these environments, where we encounter imperfect sanitation, and where personal cleanliness is far from what it should be. The very manner of our living may invite the presence of germs, or make us more susceptive to their ravages.

A continued aggressiveness of epidemics may at times be due to the sociological relationship of the people, even though sanitary methods are practiced. The habits of living of certain people are generally such as will promote the spread of contagious diseases, that may obtain a foothold among them. Congregations of crowds assembled at one place or another introduce an opportunity for epidemic diseases to spread. Such spreading of the causative agents of respiratory or sputum-borne diseases may be by the direct contact with the droplets of saliva, spread by kissing or by inspiring these infective agents, expelled by diseased individuals (mild or severe cases), and convalescents and by so-called "carriers," during the acts of sneezing, coughing, loud talking or spitting and expectorating. It is, however, more often spread by indirect contact in crowded quarters through the hands first coming in contact with inanimate

objects (contaminated with fresh contagious material) and then brought to the individual's mouth or nostrils.

Let us briefly review the many other ways by which the infectious sputum or droplets may be transferred from the infected to the non-infected.

The Arrows of Disease

Many of the organisms that are the cause of sputum-borne epidemics die quickly in an atmosphere devoid of moisture. A few of them withstand drying very well, and have been found many times in the dust from rooms where cases of respiratory diseases are found. It is therefore possible that some of these diseases may be transmitted by infected dust, although the probability is, that the greater disadvantage of the dust lies in the fact, that the dust particles may irritate the membranes of the nose and throat, and thus give the organisms already there a more fertile field in which to exert their activities.

The common drinking cup, utensil, or towel is rarely met with in public places. But has it been abolished in the semi-public places, or in the home? There are far too many offices, working establishments and homes still employing the common drinking cup, and even a towel for general use. There are many soda fountains and street vendors using the imperfectly cleansed glass. And may I just point out a few other transfers by direct contact, that we meet in everyday routine:

Many still practice the disagreeable habit of licking stamps, envelops, etc., which may have been handled by others, whose hands may have been unclean. Offices and especially all post offices should be supplied with the wet roller or similar contrivances (even if only a wet sponge) employed to moisten strip paper, so that individuals will not have to use their mouths for licking purposes. There are also far too many individuals, who moisten their hands or fingers with their saliva to enable them to grasp tickets, paper money, and other objects with more ease before passing them on to others.

In feeding children, there are many adults who still blow their breath on the child's food to cool it, or even taste it, and feed the child with the same portion they had to their own mouth. The adult may be a carrier of disease, without knowing it.

The breast-fed child is not only in close contact with the secretions of the nose and throat of the mother, who must be careful, but I believe very frequently, the child fondles and takes the breast after the nipples may have become contaminated from the mother's cloth-

ing or hands. Mothers are told to wash the nipples with boric acid solution before each feeding, but is this done by all at every feeding?

In this connection, mention may be made of the too frequent use of dirty pacifiers and unclean nipples for bottle-fed children.

Then we have the friendly transfer of pocket handkerchiefs, or the adult employing his own kerchief on the child's mouth or nostrils. The placing in their mouths of objects, which may have been used by others, is of frequent occurrence. There are many familiar practices of school children and playmates, affording opportunities in the direct passage of an infective agent, as in the use of candy, chewing gum, moistened pencils, toys, kissing, etc. Children possessing the habit of keeping their fingers in their mouths should be corrected and rid of such practice. Kerchiefs should be changed frequently, especially after much secretion has accumulated on them.

The help question in the home is a serious problem today. Many housewives are compelled to obtain help, who possess personal habits that are far from clean. Many of them sleep out, usually in congested quarters with friends or relatives. It is really difficult to avoid bringing infections into the homes, when this condition prevails. The least the housewife can do is to advise (and see to it that it is carried out) that assistants of such type do not fondle and caress the children, as so many of them are prone to do.

In the home, especially, where a diseased individual may be found, one may find that the utensils and tableware, which may not have been scalded or cleaned properly, may help in spreading the infective agent from individual to individual.

Telephone mouthpieces harbor moistened droplets of sputum, saliva, etc. Individuals who have a habit of placing their lips directly within the mouthpiece are apt to have an infective agent transferred to their own mouths. The use of white celluloid, glass or similar guards, which should be wiped or cleaned frequently, is to be advocated.

With the wide use of the lipstick, a warning may be sounded against the friendly interchange and application of such cosmetics belonging to others.

The close contact, that inevitably occurs in sleeping quarters or bedroom, makes it necessary to guard and clean these quarters with greater care. The patient's or carrier's environment is almost always infected by droplets expelled during talking, sneezing, spitting or coughing. Whether or not bedding and clothing play an important

role in the transmission of the infective agent, deposited thereon, is not always possible to determine. It is highly improbable that the droplets will actually reach the mouths or nostrils of those in the room, unless they get on the hands during the handling of the material; or if an individual should sleep on or wear such contaminated material. We may reason, however, that after the drying of the saliva or secretions, the infective agent may be stirred about in the room; and if it is a strong resistant organism, the dust may become infective. Whether or not such reasoning is correct or incorrect, it is obvious, however, that clothing, bedding and all other personal belongings will not be injured but surely benefited by frequent exposures to fresh air and especially sunlight.

It is well-established that contaminated milk may assist in the spread of diphtheria, scarlet fever, epidemic streptococcus or septic sore throat and other respiratory diseases. There is the same possibility that other foodstuffs may become contaminated with such infective agents. It is therefore advisable to practice at all times the thorough washing of fruits and all other foodstuffs, which can be conveniently washed. Wherever possible such fruits should be peeled. Other foodstuffs can be cooked; and milk should be pasteurized, unless one is assured of the cleanliness surrounding the collection of such milk.

Even Hector the Pup May Be Guilty

Various domestic pets have been regarded by the layman as being able to communicate respiratory infections. Thorough experimentation covering but a few diseases has revealed, that there is no ground for believing that these pets can serve as carriers of such infective agents. It would be best, however, to avoid fondling these pets, until more data will become available.

Concerning the host, there are many factors which may lower his general resistance, so that harmful micro-organisms are enabled to exert more readily their destructive powers. These, frequently referred to as the predisposing causes, depress the individual's vitality, producing a diminished resistance. They may include one or more of the following:

Improper or inadequate ventilation, dusty or too dry atmosphere, sudden changes of temperature, exposure to wet and cold, insufficient or unsuitable food; overwork, fatigue and worry, insufficient sleep and rest, physiological defects in the respiratory tract.

Many of the foregoing causes which diminish resistance to infection require the application of common sense, which is just as important in sanitation as the principles of hygiene. In addition, life in this country today requires a greater knowledge of mental hygiene, a branch of personal hygiene which is being sadly neglected.

The mere mentioning of most of the foregoing predisposing causes is in itself sufficient. I think you can readily see how they may act in lowering the resistance of an individual. But there are some fads in vogue, that should not be practiced, and certain principles involved with which you should be familiar. I will therefore ask that you kindly bear with me for a while, so that I may bring these to your attention.

Why are sputum-borne diseases most common and usually only epidemic during cold weather? The seasonal prevalence of these diseases may be partially explained by the fact, that there is an increase of nasal and oral discharges resulting from the cold weather. The hand touches the nose and mouth more often in the winter, than during the warm weather. Frequent hand contamination, and mouth to hand and hand to mouth transmission assist greatly in doing the rest. I personally feel that the use of the gauze mask by many of us during that great disastrous Pandemic of so-called "Influenza" eight years ago gives weight to the theory of the role of transmission, played by the hands. The gauze mask does not exclude airborne organisms, but it does prevent the wearer from bringing his fingers to his nose and mouth at frequent intervals. He thus finds it impossible to introduce discharges from some other person, that may be on his hands, or to soil his hands with his own excretions. Mask are therefore of some value in curbing severe epidemics.

Another important reason for the prevalence of respiratory diseases in cold weather is directly due to the fact, that children and adults, who are not warmly clad, necessarily suffer from the exposure to the cold, in the performance of their duties. It may look nice to be stylish, but, by so doing, you may be abusing your lease of life. You may think that waiting a week or more before you put on that warm clothing won't matter, but let me assure you that the influenza bacillus, the streptococcus, the pneumococcus and the other bacteria will be on hand to take advantage. They will convince you that they make no allowances. There is nothing so shameless, so arrogant, or so damaging, as the commonly observed disease-producing bacteria. Your warm clothing is part of that armor that you

must employ at the proper time in your warfare against disease. Don't make a martyr of yourself in the name of custom, for truthfully you may be flirting with death.

The fad of outdoor sleeping, or having your windows wide open at night is responsible for much trouble and misunderstanding. Fresh air is good and absolutely essential. The more—the better. But must it necessarily be cold air, or do we have to be cold when receiving our supply? The air may be cool, but it should not be cold. Sleep out-of-doors if you want to—but keep warm. Open your windows as wide as you want, but use a muslin screen or some ventilating device so as to check the cold stream of air and wind. See that you don't have to shiver, and that you quickly protect yourself, when getting out of bed in a cold room. Some arrangement should be used to see that the covers are kept intact over the bodies of children when sleeping in cool rooms.

In the school room or office or plant, don't expose yourself suddenly to the cold air by opening your windows, unless you are warmly clad.

I think teachers especially in elementary schools should take more precautions than some of them do, when raising the windows suddenly during exercise, that they may be conducting during daily routine. And they should not allow the youngsters out during recess, unless they have their overcoats or are warmly clad. The important fact to keep in mind is that the body temperature must be maintained at a constant equilibrium, and unless the body heat is conserved, we may anticipate trouble. During the summer months, this can easily be done by removing the clothing. During the cold months, the only rational way is to supply sufficient or suitable covering. By all means keep warm. I firmly believe that exposure to cold is one of the greatest factors predisposing to respiratory diseases.

In this connection, mention may be made of an undesirable practice in vogue in some of the school districts. In those communities where the elementary pupils are in attendance two sessions, a half-day holiday was generally allowed on the days when the weather was bad, so as to avoid undue exposure. I understand that some school boards have stopped this practice, and all children are expected to be in attendance both sessions, regardless of the weather conditions. I think that school authorities, who have approved the latter plan, should reconsider their decision, especially where it affects the primary

grades (first, second and third years). Many of these young children live a long distance from the school. It may not always be convenient for an adult to take the child back to school in the afternoon session. They are usually too young to guard themselves against the rain, even with an umbrella and other means of protection. It would be much better to advise such young children to remain home, rather than expose themselves (at least on two more occasions) if they are compelled to attend two sessions.

During the cold months, various methods of heating are in general use. Some of the heating devices do considerable harm by causing excessive drying of the atmosphere in the room. The absence of the proper degree of aqueous vapor in an environment makes those present more susceptible to the cold. A room at sixty-seven degrees F. with the proper tension of aqueous vapor will be comfortable, whereas the temperature will have to be raised almost ten degrees, before one can feel comfortable if the proper degree of aqueous vapor is absent.

Perhaps more important than the discomfort is the fact, that in such an atmosphere, the respiratory passages very quickly become dry, and in turn become irritated. The mucus covering the mucous membrane acts as a mechanical protector, catching and holding foreign particles and bacteria, thus preventing their further access. The abstraction of moisture from the membranes of the nose and throat results in the mucus being replaced by dry crusts, subsequent inflammation and irritation, and the possibility of infection.

It is absolutely necessary to arrange for the presence of the proper degree of aqueous vapor. This can be done by keeping a pan of water on the stove, or water in a trough attached to each radiator, or any other similar device, which can be easily improvised in any environment.

Just as ventilation may be found defective when the supply is insufficient, a similar condition may prevail when excessive drafts are present.

I think you can all appreciate just how undue fatigue will affect an individual. Accidents not only are prone to happen to those, who have tired nerves, tired muscles and a tired brain, but they may be the direct cause of accidents to others. And in addition, they predispose to many diseases. Remember that children, students and everyone, who is preparing himself to meet the storm of life, need strength. Excessive fatigue weakens. Constant daily work just a

little beyond the powers of one's endurance will leave one a ready victim to disease. Parents should see that they, and especially their children, are not overfatigued in the endeavor to move rapidly along the road of progress.

Are not some of us thrusting too much on the shoulders of our children with their school, music lessons, dance and gym classes, play, etc.? Children will rarely admit that they feel tired and exhausted. It is therefore the duty of the parent to investigate, and know when and how to direct children in their daily routine.

Our brain functions by sending its messages over long circuits, connected with various avenues in the body. All that I can say about worry and aggravation is that they short circuit these connections. I think that you can see or realize the further developments in store for one, who lets worry and aggravation stay with him over an extended period of time.

What Is a "Cold"?

Many diseased conditions found in humans take the name of their most prominent symptom. Thus we have scarlet fever, whooping cough, infantile paraylsis, sleeping sickness, etc. The common "cold" is so named, because of its supposed principal cause. But the term "cold," as it is popularly applied, is in reality a misnomer for this abnormal condition, with which we are familiar, and which causes us more annoyance, than any other single ailment. An exposure to cold is not necessarily essential to obtain the discomfort generally characteristic in common "colds."

One of our greatest enemies assisting the upkeep of the high incidence of respiratory diseases is this common "cold." So called "colds" are generally taken as mild infections. But "colds" frequently diagnosed or labeled under a host of different names, are very often the cause of severe epidemics; and worse than the "colds" themselves are the sequalae of these. Many of our other respiratory infections may begin like a common "cold." Other of our respiratory diseases may begin like a common "cold," and are highly contagious at this period, even before the other symptoms appear, and the actual diagnosis is made. In some instances only the early cold or catarrhal stage appears, while the other stages never develop, and the patient remains free from other symptoms during the whole course of the disease. A policy of nursing or caring for a "cold" in its early stages,

with more care than is expended by most people, will be of great benefit to all in reducing both the number of respiratory infections, as well as the danger of epidemics.

I think I will be conservative in my estimate if I say, that in this country alone there are at least 250 million days lost a year due to sickness caused by "colds." At a minimum rate of four dollars per day, the economic loss amounts to at least a billion dollars each year. It may be that the actual figure is several times this amount. The economic importance of being healthy, avoiding colds and caring for them in their early stages, becomes more important, when we think of this loss.

The common contagious "cold" is caused by one or a group of two or more organisms. These may normally be present in the mucous membranes of the nose and throat. They are prevented from exerting their noxious influence or from multiplying and reproducing rapidly, by the protective properties of the mucus which is present. As soon as this protective barrier is broken down, the organisms exert their effect by multiplying and attacking the mucous membranes. Finally the poisons produced by these organisms, after reaching an appreciable quantity, enter the blood stream and the production of headache, pain all over (especially in the joints), general malaise and the other characteristic symptoms are the result.

Exposure to drafts, sudden changes of temperature, chilling of the body, etc., do not and will not produce "colds." But they, as the predisposing factors, help to destroy nature's protective barrier. The specific causative agent already there then produces the "cold."

In some cases a second process may be explained, by which contagious "colds" may be produced. Here the predisposing factors play little or no role. The entrance of large numbers of exceptionally virulent bacteria into the respiratory tract of an individual will produce a spontaneous "cold," due to the fact that the average individual is generally unprepared to resist large numbers of highly virulent strains of organisms, coming directly from without, and usually from one suffering from a "cold."

The exact cause of some of the air and sputum-borne diseases are not known as yet. This is especially true of smallpox, mumps, chickenpox and German measles. In spite of this lack of knowledge, the many facts, characteristic of the respiratory diseases (the causes of which are known), are also of value for those respiratory infections in which the exact causes are still unknown. As men-

tioned, these are, that they occur endemically and epidemically. The different cases as well as the various epidemics of these diseases vary in their severity, in their prevalence, duration, contagiousness, etc. At times, they may be difficult to diagnose. Although few cases may be found constantly in certain localities throughout the year, the greater number of them prevail during the cold season. Many of these infections begin as a cold, or may apparently act mildly as far as symptoms in general are concerned. But they are contagious and the mere presence of an affected one who is careless is sufficient to cause others to become ill. It is this apparent mildness, coupled with other minor factors, which make it difficult to suppress or prevent the spread of them. The affected person must exercise great precaution, which others, who are in danger of contracting the disease, cannot do for him. It is due to this, that health and disease are not to be regarded merely as the private concern of an individual or family, but conditions in which the entire community, and even the nation are interested. All of these respiratory infections are spread by the discharges from the nose, throat and mouth. All are crowd diseases, in the sense, that their spread is favored by the crowding of human beings, either in the home, at work or in public places. To control the spread of these diseases, they should be discovered early. It is therefore the duty of the affected one to present himself before his doctor, as soon as he feels some discomfort and not wait until he feels worse. All of these respiratory infections are liable to complications of one kind or another, and it is these and their sequalae, which add materially to the high fatalities that prevail.

I have discussed the many predisposing factors, the characteristics of bacteria, and given you a number of general measures, which may be taken to prevent sputum-borne diseases. There are, however, a number of specific measures which should be brought to your attention.

The sick, all cases including mild and convalescent cases, as well as carriers should be segregated. This is known as isolation. Quarantine refers to the detention of all persons (even those apparently in good health), who may have been exposed to a communicable infection. The length of time one should be quarantined is equivalent to the period of incubation of the disease. This incubation period, which varies for the different diseases, is the length of time that elapses between the exposure to a disease and the beginning of symptoms.

"In Quarantine"

The two terms isolation and quarantine are often used interchangeably.

Isolation and quarantine have been and still are unpopular. The question has always been asked by the layman whether the considerable amount of inconvenience caused by such treatment is really worth while. The answer is irrevocably, yes. Isolation and quarantine are most valuable measures in reducing the prevalence of communicable diseases. But the decision as to when and how to isolate, or whether the other members of a household should be placed in quarantine, must be decided for each disease and even each case separately. It is also important to see that the attending factors are considered before arriving at a decision. If our environments ever reach that state, wherein they will be found to be in the best sanitary condition, and humans will observe the laws of hygiene in accordance with the teachings of modern science, there will be no need for quarantine, and only the sick will be isolated voluntarily.

The darky, who referred to his child, ill with measles, as being "in guarantee," had a fair idea of the nature of quarantine anyway, for such isolation does "guarantee" some safeguard over the welfare of others.

It is to be hoped that some better method of protection from these epidemics will be found to replace the somewhat ineffectual one of unpopular quarantines and regulations which inconvenience travel. But, remember, that isolation of the diseased one or carrier, harboring organisms that are the cause of communicable diseases, is here to stay, and will always remain one of the chief measures for the control of communicable diseases. Every case isolated is a focus of infection placed under control, and is to be so treated, in order to prevent the spread of this communicable disease to others. Isolate the diseased one, as soon as the early symptoms appear, even, if it is only a "cold." If you will remember this fact, and cooperate with the public health worker in carrying it out, you will assist in preventing the spread of air and sputum-borne epidemics, and perhaps the future may find itself completely rid of these disasters. It is to be regetted, that many laymen do not cooperate as they should. There are many cases of communicable diseases, which are not placed under proper control. Some bring pressure to bear, so that the attending diagnostician does not report the case. There are other laymen, who because of previous contact are capable of detecting

certain cases of measles, chickenpox, etc., and not wanting to be quarantined, they treat the cases themselves to the best of their ability. It is a frequent occurrence therefore to find, that many such cases leave their beds before the proper time. And of greater harm to the community is the fact that these convalescent ones are allowed to mingle with everyone (children are sent to school, adults go to work), and the result is that the nucleus for the development of an epidemic is here. Mothers, who really know better, send their children, convalescing from communicable diseases, too early to school, so as not to be annoyed by them around the home. But, if they would stop to think how they would feel, if they learned that their healthy child was to be found in such an environment, created by some other child's mother, I think the health worker would not have to appeal to them again for cooperation.

Efficient Disinfection of Sickrooms

A question which the layman always wants to know is how to disinfect the room, in which the patient has been isolated. Gaseous fumigation, frequently termed terminal fumigation, is not practiced to any great extent today in preventing the spread of air and sputum-borne diseases. After the patient is released from isolation, a general cleaning of the room should be practiced. All woodwork, floors, and everything (including the bed), that will not be injured by water should be washed with hot water containing 1 or 2 per cent. of an efficient coal tar disinfectant. All kerchiefs, linens and fabrics, that have been exposed, should be disinfected in a similar solution or boiled and laundered. Other material including mattressess, etc., which can not be washed or laundered, should be removed and exposed to the air and sunlight. The room itself should also be aerated and if possible, receive the beneficial effects of the sun for a few days. After such treatment, there will be no danger if healthy individuals are to occupy this room.

There is one disease, which is included in this list under discussion, that parents are apt to take little pains to avoid. They even sometimes expose their children to cases of measles, which is the most highly communicable of all acute infections, due to the fact that it is most contagious, even before the eruption appears. It is a mistaken belief, that every child must sooner or later contract this disease. In the present state of our knowledge, we know that this

is not true. Measles, once regarded with humorous scorn, is to be feared far more than the other dreaded communicable diseases. Furthermore, most of the complications and fatalities in measles occur during the first six years of life, with the result that measles is today regarded as a deadly disease, possessing a great destructive effect on child life. If we can even delay the onset of this disease beyond the age of six, it is possible that there may be a marked decrease in the mortality and complications that occur.

The possibility of employing chlorine and similar gases in any protective campaign, aiming at the eliminating of air and sputum-borne diseases cannot be considered at this time, as they have not yet proved to be of any marked value.

Other than the application of general sanitary measures, and guarding against many of the predisposing causes, the prevention and control of some of these air and sputum-borne diseases is best carried out or aided by artificial immunization.

The prevention and control of smallpox depends primarily upon the artificial immunity or resistance, created by vaccination with modified smallpox virus. Remember that one vaccination against smallpox will afford only a temporary protection, which will wear off after seven to ten years. Two vaccinations of individuals (preferably at the age of one and twelve), living in countries where smallpox is not common, are usually sufficient to protect them for life against this dreaded disease. If there is particular danger of exposure to smallpox, as there would be by those visiting the Far East, it is usually advisable to have the vaccination repeated, even at five-year intervals, as is practiced in Japan.

Diphtheria may become not only one of the preventable, but also an uncommon disease in the very future, if the layman will cooperate with the public health worker by seeing that all children, who are not naturally immune to diphtheria, receive the artificial immunizing treatment against this disease.

The Newer Defensive Remedies

Diphtheria, until recently an unconquered scourge of children, has been and is gradually being subdued and eliminated by means of its own poison, which is constantly being produced and thrown forth by the Diphtheria Bacillus. This poison, injected between the layers of the skin, tells whether or not one is susceptible to the dis-

ease, giving us what is known as the Schick Test. Injected deeper and in larger doses under the layers of the skin, this same poison causes the body to build up a resistance against it. This is the principle of the three injections of the Toxin-Antitoxin mixture. It is, however, always advisable to follow up these injections by means of a Schick Test, so as to be assured that the patient has developed a resistance, and thus possesses the power of neutralizing the attack of any subsequent natural exposure to diphtheria. In most cases, the Schick Test will be negative after one series of injections, but there are some subjects who require more than one series of injections to protect them completely against further attack. It is to rule out such cases, that it is always best to repeat the Schick Test after the series of injections has been completed.

I have personally obtained positive cultures in children, who displayed all clinical signs of diphtheria, even though one series of Toxin-Antitoxin mixture had been administered. In these cases, I mention, the Schick Test was not repeated after the injections.

Observations thus far have demonstrated, that by the injection of the T. A. (Toxin-Antitoxin) mixture, a child probably will be protected for life against diphtheria.

Artificial immunization against smallpox and diphtheria have definitely proved of value in affording protection. It is to be recommended as the only logical action to take rather, than to blindly trust to luck.

Blood and blood serum from convalescent cases of scarlet fever and measles have been used with some degree of success in the treatment of patients, ill with scarlet fever and measles. Encouraging results have also been obtained in the use of such blood or blood serum in affording a means of prevention against these diseases.

The causative agents of scarlet fever and measles remained undiscovered for years. In 1924, Drs. G. F. and Gladys H. Dick, of Chicago, claimed that certain streptococci were the cause of scarlet fever. With the poisons (known as Toxins), secreted by these streptococci as a basis, they developed an anti-scarlet fever serum, which, being of specific value for the toxins, is known as (scarlet fever or streptococci) antitoxin. The toxins from these streptococci are employed in the so-called Dick Test, to determine whether one is or is not immune to scarlet fever. The test is performed in the same way as the Schick Test. The antitoxin is recommended for the prevention and the curative treatment of scarlet fever.

The year following, French scientists, working under Prof. Leon Bernard, and Drs. Ferry and Fisher in this country announced the discovery of a streptococcus, as the cause of measles. It appears that streptococci in their various forms and strains are accountable for many diseases, including septic sore throat, erysipelas, etc., in addition to being able to induce general blood poisoning. An anti-measles serum was recently introduced to make possible the prevention and control of measles.

Experience in the use of both anti-scarlet and anti-measles sera or antitoxins have demonstrated the value of these preparations in the treatment of the respective diseases, especially if they are employed immediately after a diagnosis is made. Their use in the production of an immunity or resistance against scarlet fever and measles has not extended over a sufficiently long period of time for an estimate of their exact value as agents which will afford a protection for many years. Until more data over a longer period of time is forthcoming, it will be impossible to determine the practical value of these preparations, and I think unwise to advocate their UNIVERSAL USE as protective agents, as in the case of modified smallpox virus for smallpox and the T. A. mixture for diphtheria. Since experimental and clinical observation have demonstrated that these antitoxins confer protection lasting from a few weeks to two months, these preparations offer a valuable safeguard for immediate use by children and in cases who may have been exposed to sufferers of these diseases.

Practical considerations must be taken into account when we proceed to advocate universal vaccination. It would hardly appear desirable to advise universal vaccination against diseases which do not occur in sufficiently large numbers, as in the case of meningitis, septic sore throat, etc. Such procedure is only advocated to introduce a protection against those communicable diseases, that are commonly found and which nearly all of us either as children or adults may easily contract.

Vaccines have been prepared against some of the other sputum-borne infections, that may become epidemic. Such preparations are available for whooping cough, influenza, colds and meningitis. It is difficult to obtain information as to their efficacy. In all of these cases, it does not appear probable that the use of vaccines will afford a protection against the respective diseases for any great length of time. There are so many other practical difficulties in the way of efficient vaccination against colds and influenza, that it is unwise to attempt to make such measure the basis of a universal protective

campaign. It is best to allow each case to be treated individually by the attending diagnostician, who must consider all facts in the case, and perhaps resort to the use of vaccines, when other measures do not completely give the desired results.

May I impress upon you the fact, that a greater importance is to be placed upon the general methods, which were considered for the reduction of all air and sputum-borne diseases. Specific measures, that will materially reduce the incidence of many of these infections, are only to be advocated for universal use, after extended experience has proved their value.

In conclusion, may I say that I hope you have been impressed with the necessity of training yourself to conquer disease, especially those epidemic in character. It should be your duty to cooperate in public health work, not only by training yourself, but by exercising such influence, as may be possible, on those within your immediate environment, that they too will cooperate. Bring legitimate influence to bear on all agencies, that are concerned in any way with the educational system of your community, from the elementary school to the college, or in the distribution of knowledge, whether it be the newspaper, magazine, and other publications or the visual agencies of the motion picture screen, pictorial reviews, or over the speakers table at the lodge or the various beneficial organizations.

The mere fact that you believe in the principles behind public health movements is not sufficient excuse for you to sit back with a proud satisfied air, and with a feeling, that you have enrolled, and that's that. Do not be a joiner, but a doer. Be a working member as well as a signing member of the desirable movements in your community. Do not merely enlist, but march forward with those ideals, with which you are delighted to identify yourself. By so doing, you will advance the physical, mental and moral welfare of our nation.

I also wish to say that I do not want to leave you with the impression, that I am making scientific efficiency something supernatural, or that health and sanitary regulations are to be uppermost and constantly in your mind. All that I ask is that these correlated facts be incorporated merely as one of the important articles of your creed, that you have framed to guide you through life's journey. You will thus be able to function better and live longer. And may I say that you will benefit even more in reaching this goal, if you become imbued, not only with the facts, but with the spirit of science, and the code of the Fifth Estate, which directs its men to give service unselfishly (to humanity).

DETERMINATION OF FAT IN MALTED MILK

By Edward S. Rose

THE WRITER having had occasion recently to determine the fat content of malted milk, was rather surprised to find that there was very little mention of it in the literature.

The purpose of this paper is to discuss several methods and suggest a suitable one for this determination.

In looking for a method of analysis one naturally turned to milk products and especially powdered milk. Several methods for milk, condensed milk, and powdered milk have been in use; notably, the Soxhlet extraction, Roese-Gottlieb, and Werner-Schmid.

Several investigators found that the Soxhlet extraction method gave low results. They claim that a part of the fat is held mechanically by casein, this being due to the process of reducing the milk product to a powder. The writer found that the method gave low results.

The Roese-Gottlieb method or a modification of it is found in text-books and said to be reliable and well adapted for milk powders. Essentially this method consists of the extraction of the fat with ether and benzin from a hydro-alcoholic mixture made alkaline with ammonia. In this method the writer found a decided tendency to emulsify and remain so. This was overcome somewhat by using in the extraction a mixture of equal parts of benzin U. S. P. and ether U. S. P.; however, it did not give dependable results. Some writers speak well of it, claiming it does not give high results due to extraction of material other than fat. The writer found that 1 gm. of a mixture of equal parts of dextrin, maltose and lactose (carbohydrates found in malted milk) on extraction with this method gave an aromatic residue weighing 3 to 4 mgm.

The Werner-Schmid method consists briefly of the extraction of the fat with washed ether from an aqueous mixture of the milk product which has been made strongly acid with hydrochloric acid and boiled or heated in a steam bath. The writer found that this method needed some modification and careful handling to give reliable results. As has been pointed out, it was found that ether extracted material from the carbohydrates, being about 5 mgm. for 1 gm. of the carbohydrate mixture mentioned above. It was also found that a part of the ether would remain with the aqueous-acid layer. Benzin U. S. P. when used as an extraction medium separated completely and did not extract any appreciable amount of material from the carbohydrates,

but on the other hand it did not extract all of the fat. A mixture of benzin U. S. P. two parts and washed ether one part made a suitable extraction medium. Some brands of malted milk showed a tendency to emulsify this mixture, which was overcome by using less sample. To reduce to a minimum any loss of liquid from the test tube due to vapor escaping, a cork stopper was used through which was placed a piece of glass tubing about four inches long, bent at about a right angle, and to which was attached a short piece of rubber tubing. The rubber tubing was held tightly with the fingers during the shaking and occasionally the liquid was allowed to flow back into the test tube and the pressure of the fingers released to allow the vapor to escape.

A suggested procedure for the determination of fat in malted milk is a modified Werner-Schmid method as follows: 0.5-1.0 gm. of the malted milk is placed in a large test tube and 5 cc. of hot water added to emulsify. Then 10 cc. of conc. HCl is added and the mixture placed in a boiling water bath for five minutes. This mixture is cooled and shaken two minutes with 25-30 cc. of a mixture of benzin U. S. P. 2 parts and washed ether 1 part. The piece of rubber tubing is removed and the bent glass tube and stopper is washed with a few cc. of the extraction mixture. The test tube is allowed to stand and the benzin-ether layer is blown off in the usual way on to a dry filter into a tarred flask. Repeat the extraction twice. Now remove the benzin and ether from the combined extractions by distillation and dry the flask in an oven at 95-100 degrees C. Cool in a desiccator and weigh. Repeat to constant weight. At all weighings the flask should be carefully wiped with clean tissue paper and allowed to remain in the balance three minutes before weighing.

Results obtained:

Lot 1—

0.7 gm. sample gave 8.19 per cent. fat
0.7 gm. " " 8.36 " " "
0.7 gm. " " 8.40 " " "
0.8 gm. " " 8.19 " " "
1.0 gm. " " 8.40 " " "

Lot 2, same brand—

0.6 gm. " " 8.21 " " "
0.7 gm. " " 8.41 " " "
0.8 gm. " " 8.31 " " "
0.9 gm. " " 8.40 " " "

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THE WELLCOME HISTORICAL MEDICAL MUSEUM*

THE WELLCOME Historical Medical Museaum was founded by Mr. Henry S. Wellcome in 1913, and was adopted as the Museum of the Section of History of Medicine which formed part of the XVIIth International Congress of Medicine held in London in that year.

It was inaugurated by Sir Norman Moore, F. R. C. P., on June 24, 1913, and has been open as a permanent Museum of international character until recently closed for re-organisation and enlargement.

It is designed to present collections illustrating the History of Medicine, Surgery, Chemistry, Pharmacy and the Allied Sciences, and to be of educational value to research workers, students and others interested in the subjects with which it deals.

It also affords a resting-place for relics of distinguished pioneers in medicine and the allied sciences.

The Hall of Primitive Medicine illustrates the methods by which primitive races cure their bodily ills. In Section I, the methods of the layman are shown, but particular attention is paid to the medicine-man who works by supernatural methods. The treatment is shown to be profound and far-reaching in its effects. The medicine-men are shown in effigy, together with their equipment, which includes bags of curious material, *i. e.*, dried animals, earth, twigs and miscellanea generally. Godlings, fetish figures, ancestral effigies, etc., are represented in their various categories. Attention should be paid to the magnificent collection of shrunken heads from South America, also the New Guinea head-hunter's hut.

Section II is devoted entirely to magic; here, amulets, talismans, charms and mascots are represented. An examination of this series shows that a belief in the efficacy of these objects, whether to avert evil or ill-health, or to obtain good luck or good health, is spread universally over the world, and has existed from prehistoric times to the present day. The credulity of present-day folk is illustrated clearly by modern lucky charms, mascots, etc. Nowhere more than in London do we find a belief in the efficacy of these objects.

In the Anatomy Room, a remarkable series of historical mate-

*Reopened October 14, 1926.

rial is shown, including rare models in ivory of the human body. These were used to teach anatomy and midwifery in the XVIth and XVIIth centuries.

In the Vestibule is a case containing very rare relics of Saints; in it are also relics from France of Henry II and Richard I.

In the Hall of Statuary, the classical period in medicine and surgery is illustrated, also the evolution of various surgical instruments. Deities connected with healing are represented, and exhibits in the cases illustrate the development of surgical skill throughout the ages. The section of dentistry is of great importance, as it deals with the historical development of dental instruments and dental prosthesis.

In the Gallery is a magnificent series illustrating the development of the miscroscope and of optics in general. Here is also the section devoted to the History of Chemistry. Galvani's original apparatus, and instruments invented by Lord Rayleigh and Lord Kelvin are also shown.

In the Portrait Gallery, attention should be paid to the portraits and personal relics of distinguished physicians and surgeons. At the end of the Gallery is the famous collection of material which Jenner used in vaccination. Here will be found the original instruments, documents, etc., in connection with his great work. In the historical cases will be found medicine chests which belonged to the Duke of Wellington and to Nelson; also the tourniquet which was used when Nelson's arm was amputated at Santa Cruz. Other cases in the Gallery contain objects illustrating the history of healing by the Royal Touch; also pomanders, etc., and certain surgical instruments.

In the Alchemy Room are exhibits illustrating the history of the mystic art, astrology, divination and witchcraft.

The main portion of the section in the back part of the Ground Floor is devoted to the history of war, surgery and medicine. Prominent are the naval and military collections of material and pictures relating to the Great War (1914-1918).

Other sections refer to surgery in general, the history of the syringe, gas masks, splints, bandages, tourniquets, orthopædic appliances, etc., etc. Mediæval appliances for the reduction of dislocations, etc., are represented by actual examples, also by models. Pic-

tures dealing with plague, leprosy, obstetrics, torture, etc., etc., are also shown.

An important feature is the Lister Section, in which is included a portion of the actual ward in which Lister practised his antiseptic system of surgery. The furniture and fittings are from the ward which was demolished in 1924. In the adjacent cases will be found material actually used by Lister.

On the southeast side, is a reconstruction of a lying-in room of the XVIth century.

Between the Ground Floor Back and the Pharmaceutical Section is a collection of pictures illustrating medical robes from early times to the present day.

In the front part of the Ground Floor, most of the objects, appliances, implements, apparatus, books and documents relating to the history of pharmacy have been arranged. Round the sides the following shops are arranged to give a street effect:

1. An English Alchemical Manufacturing Laboratory of the XVIth century. This reconstructed laboratory is one such as Paracelsus might have used. Mysterious, gloomy and dark, with strange animals and fish suspended from the roof casting fantastic and eerie shadows on the old stone walls, it offers a glimpse of the surroundings of the worker in science some four centuries ago. Most of the equipment in this laboratory was in use in England for the production of medicaments until quite recently.

2. A London Chemist's Shop, XVIIIth century. The shop front is the original of the pharmacy established in 1798 by John Bell, father of Jacob Bell, founder of the Pharmaceutical Society. The vases and ewers in the interior are of old Davenport ware, the ointment jars of Staffordshire stone ware, and the essence bottles of early red Bohemian glass. The laboratory in the rear contains the original ancient fittings of a pharmaceutical laboratory of the XVIIIth century that once stood in Russell Street, Covent Garden, London. The preliminary discussions regarding the formation of the Pharmaceutical Society took place in this building.

3. Apothecary's Shop, 1625.
4. Italian Pharmacy, XVIth century.
5. A Barber-Surgeon's Shop, XVIth century.
6. Native model of a Chinese Drug Shop.
7. An original Turkish Drug Shop of the XVIIth century, transferred from the Old Drug Bazaar in Constantinople and reconstructed in the Museum.

In the various cases are copies of Hortus Siccus and early herbals; Terra sigillata and the history of this ancient medicament from 100 B. C., together with specimens of the "Sealed-Earth" of various kinds used in different parts of Europe; Theriaca; rare and curious drugs, including Bezoar stones, eye stones, Chinese ginseng-root, poison sucking stones and drugs used by native witch-doctors; curious specimens of jalap, having a natural resemblance to birds, animals and reptiles; specimens of drugs showing adulteration; ancient Egyptian drugs excavated from a grave, 1500 B. C.; mandrake roots; medicine chests and cases; pill-making apparatus and Delft slabs; ancient pharmaceutical apparatus, etc.; barbers' bowls and basins; hot water bottles; funnels; etc., etc.

ABSTRACTED AND REPRINTED ARTICLES

PHARMACEUTICAL RESEARCH IN AMERICA DURING THE PAST SEVENTY-FIVE YEARS*

By H. V. Arny

THE REQUEST of the Jubilee Committee for a 1200-word paper on "American pharmaceutical research during the past seventy-five years" is almost like attempting to describe New York City on a postcard.

To cover the fine work of American pharmacists in the way of research in so limited a space means a mere summarizing of the

*Reprinted from the 75th Anniversary Book of the New York German Apothecaries' Society.

salient points. It means moreover the omission of much that could be profitably presented.

When the New Yorker Deutscher Apotheker Verein was organized in 1851, the outstanding figures in pharmaceutical research in the world (pharmacists, chemists, and botanists) were Wittstein, Buchner, von Planta, Mitscherlich, Hlasiwetz, Liebig and Wagner in Germany; Orfila, Rabourdin, Peligot, Cazentre, Dorvault and Aubergier in France; Hamburg, Pereira, Stenhouse, Ure, Graham and Muspratt in England; and William Procter, Jr., in this country. The outstanding research achievements of 1851 were Pasteur's work on the optical activity of the tartaric acids and Smith's discovery of aloin. Turning to the strictly American side of pharmaceutical research, Procter, as pharmacist, as editor of the AMERICAN JOURNAL OF PHARMACY, as teacher, and as investigator, occupied a unique position, and the *Journal* for 1851 contained a number of articles from his pen. Two other creditable pieces of American research work published in that year were papers by Durand on hydrastis and by Peterson on *Eupatorium perfoliatum.*

American pharmaceutical research since 1851 has developed by leaps and bounds so that the 1926 Census of Pharmaceutical Research shows 297 persons engaged this year in research along pharmaceutical lines. In presenting below the outstanding exponents of American pharmaceutical research we recognize that the list is incomplete, but it can at least be said that the twenty-nine names mentioned below are representative and that the work mentioned includes some of the best known to the credit of American Pharmacy. In drawing up this list an attempt is made to present the matter in chronological order, although that part of the task is not easy, since in the case of such outstanding personages as Lloyd and Power, the record of research stretches from 1879 or 1880 down to the present day.

The research roll of honor, includes beside Procter, the following:

Maisch, pharmacognocist, teacher and editor; only American winner of the Hanbury medal.

Squibb, pharmaceutical manufacturer, whose work on percolation is a classic even to this day.

Diehl, retail pharmacist and teacher whose work on percolation ranks with that of Squibb and whose monuments are the National Formulary and the A. Ph. A. Year Book.

Remington, retail pharmacist, teacher and author; whose work as chairman of the U. S. P. Revision Committee will ever be held in grateful remembrance.

Prescott, teacher and chemist; winner of the Ebert prize, whose work on alkaloidal assays was fundamental and far reaching.

Scheffer, retail pharmacist and teacher, whose pepsin investigations founded the American digestive ferment industry.

Rice, the most learned American pharmacist; Sanskrit scholar, bibliographer and pharmacopœia maker.

Lloyd, the versatile, fiction writer, manufacturing pharmacist, teacher and pioneer in colloidal chemistry.

Power, the phytochemist, whose work on drug constituents ranks among the masterpieces of research.

Trimble, chemist and teacher, whose investigations on the tannins are being cited even to this day.

Kremers, pupil of Power and Wallach, teacher, author and investigator of the first rank. A master in the field of terpene chemistry.

Rusby, botanical explorer and authority on pharmacognosy. Investigator of South American drugs, such as cocillana, pichi, coca and guarana.

Stevens, teacher and Ebert prize winner. Investigator of alkaloidal drugs.

Puckner, pharmacist, chemist and Ebert prize winner; whose self-sacrificing work in the A. M. A. Laboratory has been of immense service to American medicine and pharmacy.

Scoville, pharmaceutical expert; whose work on drug extraction won for him the Ebert prize; whose greatest service to American Pharmacy has been as editor of the National Formulary.

Schlotterbeck, teacher, chemist and Ebert prize winner; whose alkaloidal investigations were of the highest degree of excellence.

Kraemer, teacher and pharmacognocist, whose researches on starches and on the identification of powdered drugs brought him international fame.

Gordin, pupil of Prescott and like him, an Ebert prize winner, awarded for work in the field of alkaloidal assays.

Schneider, pharmacognocist and bacteriologist. Awarded the Ebert prize for his work on the identification of powdered drugs.

Beringer, retail pharmacist and manufacturer, whose work on problems of U. S. P. and N. F. Revision has been of inestimable service to every pharmacist in America.

Raubenheimer, retail pharmacist, bibliophile and historian, having to his credit a long line of investigations of U. S. P. and N. F. preparations.

LaWall, teacher, state chemist and versatile investigator. A worthy disciple of Remington, whom he succeeded as chairman of the U. S. P. Revision Committee.

Cook, another disciple of Remington, present chairman of the U. S. P. Revision Committee; a worthy successor of Rice, Remington and LaWall.

Gathercoal, teacher and pharmacognocist; Ebert prize winner; investigator in the field of color standardization.

Pittenger, manufacturing pharmacist and expert on the field of biological assays, whose work on drug standardization won for him the Ebert prize.

Youngken, pharmacognocist and Ebert prize winner, whose investigations on the anatomy of drug plants are of the highest quality.

Beal, chemist and investigator of anthraquinone drugs and of alkaloidal extraction. Ebert prize winner of 1920.

Viehoever, pharmacognocist and phytochemist. Brilliant investigator of the microscopy and constituents of vegetable drugs.

Thus closes the partial record of American pharmaceutical research during the life of the New Yorker Deutscher Apotheker Verein. The list of twenty-nine names could be easily doubled or even trebled but the twenty-nine represent investigators in almost every field of pharmaceutical activity; pharmaceutical manipulation, pharmaceutic manufacturing, pharmacopocial revision, pharmaceutic bibliography, chemical and biological assays, pure and applied chemistry, phytochemistry, botany and pharmacognosy.

Our list includes retail and manufacturing pharmacists, teachers of pharmacy, of chemistry and of pharmacognosy; men of differing

temperaments but all alike in their devotion to the cause of pharmaceutical research. With the examples of those who now rest from their labors; with the inspiration of those now in the prime of their activity; American pharmaceutical research can face the future with a calm assurance that its service to America is an assured fact and that its potentialities are almost limitless.

MEDICAL AND PHARMACEUTICAL NOTES

SO-CALLED HABITUATION TO "ARSENIC."* By Erich W. Schwartze and James C. Munch.—The Bureau of Chemistry undertook a series of experiments to find an answer to the question, Can habituation of man or the higher animals to arsenious oxide be obtained?

No certain habituation of cats to "arsenic" fed in increasing doses at suitable intervals could be shown. The loss of appetite and slowness of eating which developed, or which cats voluntarily induced, complicates an analysis of the data. This enables the cats to retain more food than they would had the meal been eaten at once and a portion subsequently vomited. This "pseudo" tolerance is not regarded by the investigators in any sense as a real tolerance.

Cats fed daily doses of dissolved arsenious oxide ("arsenic") in sub-emetic concentration developed no habituation; on the contrary, they showed a decline in appetite. They vomited once or twice early in the experiments, obviously from the cumulative superimposition of the effects of the sub-emetic doses, and thereafter regulated the food intake, apparently to avoid the emesis.

The criterion of habituation has been the threshold emetic dose, which is much lower than the concentration necessary to produce immediate and complete emesis. The failure of cats to withstand such doses, successfully is a fair criterion of the improbability of developing any noteworthy systemic or gastro-intestinal habituation to "arsenic" by feeding—the only manner in which habituation to "arsenic" has been claimed to have been produced in man or laboratory mammal.—(Through *Jour. Fr. Inst.*)

*Published in *J. Pharm. and Exp. Therapeutics, 28* (Sept., 1926); 351-360.

UREASE—FIRST ENZYME ISOLATED IN CRYSTAL FORM.—The isolation and crystallization of the first enzyme has been achieved by Dr. James B. Sumner, assistant professor of biological chemistry at the Cornell Medical College, Ithaca, N. Y. Success came only after a period of research covering nearly nine years. During a part of the time Dr. Sumner was assisted by Dr. Viola A. Graham and by Dr. Charles V. Noback.

The enzyme isolated is known as urease and occurs in the jack bean, in the soy bean and in a great many kinds of bacteria. It has been found in the horse-shoe crab and in the lining of the stomach. Urease is important in the cycle of nitrogen because it converts the urea that is produced by animals into ammonium carbonate, which is used by the plant, usually after conversion of nitrates by bacteria.

Chemists have been attempting to purify enzymes for nearly a century, but up to the time of Dr. Sumner's discovery no enzyme had ever been prepared in pure condition and the chemical nature of enzymes was entirely unknown. Indeed, a promient worker in this field, Dr. Richard Willstatter, of Germany, recently declared that the enzymes belong to no known group of chemical substances.

An enzyme, the word meaning "in yeast," is a substance elaborated by plants, animals, or micro-organisms that accelerates chemical reactions without itself being used up in the process. In other words, en enzyme is a catalyst. But the enzyme is a catalyst of a special sort. It is extremely unstable and of colloidal nature. These are the chief reasons why the isolation of an enzyme has been considered an almost impossible task. Enzymes are sometimes called ferments because they cause fermentations. Of the great number of enzymes found in living cells a few examples are: zymase, which is present in yeast and which is responsible for the alcoholic fermentation of saccharine liquids; rennin, which is obtained frim the stomachs of calves and which is used in the manufacture of cheese; pepsin, which is present in the gastric juice and which digests meat; and thrombin, which is necessary for the coagulation of blood.

Urease has been prepared by Dr. Sumner as octahedral crystals that are slightly larger in diameter than human red blood corpuscles. The crystals are protein and belong to the class known as globulins. They are able to transform their own weight of urea into ammonium carbonate every 1.4 seconds at room temperature.

The isolation of urease has opened up new fields for research and is expected to aid in the solution of many problems of the chemistry of enzymes and to lead to the isolation of still other enzymes.—(*Science Service.*)

ETHYLENE DICHLORIDE. AN EFFICIENT EXTRACTIVE SOLVENT.—One of the most interesting chemical achievements of recent years is the commercial production of the olefine gases ethylene and propylene and their derivatives, such as diethyl sulfate, ethylene dichloride, isopropanol, ethylene glycol, and ethylene chlorhydrin. Among these products of the new rapidly growing olefine industry the unusual extractive solvent ethylene dichloride is perhaps the best known, because its demonstrated utility and present availability at low cost and in large quantities have assured its future strong position in extraction practice.

The chemical and physical properties, synthesis, chemical stability, and industrial applications of ethylene dichloride have been thoroughly investigated at Mellon Institute of Industrial Research of the University of Pittsburgh, and the information that follows has been supplied by the Industrial Fellowship that has lately completed these studies.

Ethylene dichloride is a colorless liquid of pleasant chloroform-like odor, which has the following physical properties; boiling point, 83.5° C. at 760 mm.; melting point, 36° C.; density, 20/4° C, 1.2569; specific heat, 0.3054 at 30° C.; latent heat of evaporation, 157.5 B. t. u. per lb. at 0° C.

Ethylene dichloride has high solvent action on oils and fats (such as lard, cocoa butter, butter, stearic acid, peanut oil, corn oil, etc.), waxes, wool grease, and certain alkaloids, gums, resins and rubber. It may be used in the cleaning or degreasing of furs. Its solvent action is superior to that of the better known extraction agents, and it is extremely stable in the presence of water, alkalies or acids. It may be used in the presence of free chlorine, sulfuryl chloride, sulfur monochloride and other active reagents without being affected. Being quite resistant to oxidation it does not split off hydrochloric acid and produce oxidized products, as does choloroform or carbon tetrachloride; hence it may be reused or stored indefinitely. It does not corrode metals even in the presence of water at the boiling-point, and

having low specific heat, density and latent heat, it may be recovered easily and economically. At ordinary temperatures, it will burn only with difficulty. This tendency is so weak that, when ignited, the draft of combustion will blow out the flame. It has some anesthetic properties, although its vapors must be inhaled in concentrated form over an extended period to produce an anesthetic effect. It causes no deleterious heart depression and produces no serious after-effects.

Since ethlyene dichloride may now be obtained in the pure state at reasonable cost, it is well adapted to the extraction of edible oils, as its low boiling-point, 83.5° C., permits its easy recovery without leaving heavy ends or residues in the extract.

PHARMACOPŒIAL SYNTHETIC CAMPHOR.—The inclusion of synthetic camphor in the new edition of the German Pharmacopœia, which thereby for the first time becomes an official article, is a matter of more than passing interest. The importance of this innovation, from the therapeutic point of view, resides in the fact that the German Pharmacopœia officially sanctions, without any reservation, the use of synthetic camphor in the place of the natural product. In view of the far-reaching consequences of this decision, we deem it opportune to give a translation of the monograph in question, which bears the title "Camphora synthetica." This is described as: The racemic form of camphor obtained by synthesis from the pinene of oil of turpentine and purified by sublimation or crystallization. Colorless or white, crystalline brittle pieces, or a white, crystalline powder. Synthetic camphor possesses a peculiar penetrating odor, and a somewhat bitter, pungent taste, followed by a sensation of cold. Heated in an open capsule, it volatilizes completely within a short time; on ignition it burns with a smoky flame. Very slightly soluble in water; readily soluble in ether, chloroform, alcohol and oils. Melting-point not below 170°. Synthetic camphor is optically inactive, or has only a very slight rotatory power. For a solution containing 2 grams of synthetic camphor in 10 cc. of absolute alcohol, the optical rotation (at 20° C.) is —2° to +5°. On igniting 0.1 gram of synthetic camphor on a copper foil of four square centimetres, placed in a porcelain capsule, and collecting the smoky vapor in a flask of 1000 cc. capacity, previously rinsed several times with water, the liquid obtained after rinsing the flask with 10 cc. of water and filtering should, on the addition of

a few drops of nitric acid and 0.5 cc. of N/10 silver nitrate, after a lapse of five minutes, become at the most opalescent. To reduce synthetic camphor to a powder, it should first be sprinkled with ether or alcohol. [In the monograph on "Camphora"—obtained from *Cinnamomum camphora*—it is stated that "synthetic camphor may be used in the place of camphor."]—(Through *Chemist and Druggist.*)

PLANT NERVES.—The vascular bundles of plants have been found to serve a purpose similar to the nerves of animals, Professor Henry H. Dixon, F. R. S., told an audience at a lecture in Dublin, Ireland. These vascular bundles not only carry raw food material from the roots to the leaves but also transport the "chemical messengers" which take the place of nerve impulses.

The similarity of distribution of the vascular bundles in plants and that of the nerves in animals was noticed long ago, but as the details of the two systems were worked out differences between the two became accentuated rather than the similarities; now the latter are receiving more attention. In both cases a stimulus given to one part of the body often causes a reaction in a different part. If the tap-root of a plant be articially deflected from the vertical, a stimulus is set up in a cell just behind the root tip, which results in a bending of the root at that point till it is again growing vertically downwards. Again, when the tip of a grass-seddling is illuminated on one side a stimulus is transmitted thence downwards to the shaded part and causes curvature there.

It has been shown that the stimulus is propagated through some plants at a rate of 10 to 20 millimeters per second. This speed, though slow compared with the velocity of transmission of stimuli along animal nerves, is fast for plants. Scientists are beginning to believe that the stimulus is conveyed by chemical messengers or "hormones" liberated by the stimulated part into the transpiration stream.

PROGRAMME OF FREE POPULAR SCIENTIFIC LECTURES

Season of 1926-1927

To be delivered by members of the Faculty of the
Philadelphia College of Pharmacy and Science
at the
Philadelphia College of Pharmacy and Science
145 North Tenth Street, Philadelphia, Pa.

Admission Free—No Tickets Required. Lectures begin at 8.15 P. M.

Condensed Programme Popular Science Lectures 1926-1927

Paper
Oct. 7, 1926 ..... Dr. Henry Leffmann

Epidemics, Man's Most Deadly Enemy
Oct. 21, 1926 ..... Prof. Louis Gershenfeld

What Shall We Wear?
Nov. 4, 1926 ..... Prof. Freeman P. Stroup

The Story of Burnt Clay
Nov. 18, 1926 ..... Prof. J. W. Sturmer

Sand—From Mountain to Seashore
Dec. 2, 1926 ..... Prof. E. J. Hughes

Dust
Dec. 16, 1926 ..... Prof. Paul Q. Card

Colloids
Jan. 6, 1927 ..... Prof. David Wilbur Horn

The Romance of the Occult in Science
Jan. 20, 1927 ..... Prof. Charles H. LaWall

My Lady Nicotine
Feb. 3, 1927 ..... Prof. Ivor Griffith

Epochs and Epoch-makers of Medicine
Feb. 17, 1927 ..... Dr. Horatio C. Wood

Why the Weather?
Mar. 3, 1927 ..... Dr. George Rosengarten

Hormones—Mysterious Agents of Vital Life Functions
Mar. 17, 1927 ..... Prof. Arno Viehoever

Mosses and Their Message
Mar. 31, 1927 ..... Prof. Marin S. Dunn

All lectures begin at 8.15 P. M. No tickets required.

INTRODUCTION

The season of 1926-1927 will represent the sixth successive series of these Popular Scientific Lectures by members of the Faculty of the Philadelphia College of Pharmacy and Science.

Each year sees an increase in the number of persons attending these lectures, and the list of subscribers to the published lectures likewise is enlarged with every series. It is confidently believed that the programme for the coming season is of such a nature that it cannot help but meet with a similar degree of success.

Last year it was deemed wise to present the lectures at a more accessible location, namely, at the Central Branch Building of the Y. M. C. A., 1421 Arch Street. At that location, however, other conditions, notably seating capacity and lecture table conveniences, were not quite satisfactory, and the lectures will be delivered this season at the College Building at 145 North Tenth Street.

The new series will cover an entirely different list of subjects from those included in any of the previous courses.

As has been customary in the past, the lectures will be appropriately illustrated by lantern slides, specimens, etc.

The scientific information will be given as heretofore in a form easily comprehended by any person interested in science, but with no sacrifice of scientific accuracy or dependability.

The lectures, as will be seen by referring to the enclosed program, are in no sense interdependent. Each lecture is complete in itself, and you are cordially invited to attend any one or the entire series, as time, inclination or interest in the subjects permits. No

card of admission or formal invitation is required. You may come as often as you like and bring as many friends as you choose.

We shall feel repaid in proportion to the interest that is displayed by those who take the opportunity to attend.

These lectures will be broadcast from Station WFI, the Strawbridge & Clothier Company of Philadelphia, on the Monday following each lecture, at 3 P. M.

Free Public Lecture Course on Scientific Subjects, Popularly Presented

THE LECTURES WILL BEGIN at 8.15 P. M., and END by 9.30 P. M.

First Lecture **Thursday Evening, October 7, 1926**

PAPER

By Henry Leffmann, A. M., M. D.
Lecturer on Research, Philadelphia College of Pharmacy and Science; Hon. Professor of Chemistry, Wagner Free Institute of Science, etc.

Printing has been called the "art preservative of all arts." De Quincy says that the lateness of the invention is due in the main to a lack of material suitable for use with type. Paper seems to have been first made by the Chinese. It was introduced into Europe about the middle of the twelfth century. At first it was made from rags, but at present wood is the main source and much of the cheaper grade is finely ground wood held together by a small amount of true pulp. The history of paper and the methods of manufacture will be illustrated in the lecture.

Second Lecture **Thursday Evening, October 21, 1926**

EPIDEMICS—MAN'S MOST DEADLY ENEMY!

By Louis Gershenfeld, Ph. M., B. Sc., P. D.
Professor of Bacteriology and Hygiene, Philadelphia College of Pharmacy and Science

In various parts of the world people live in continual dread of tragedies caused by epidemics.

It is not becoming that we should assume such an attitude, nor should we necessarily look at the situation with only helplessness and fatalism.

There is necessary, however, a greater willingness on the part of the public to accept responsibilities and to aid in wiping out the sources of these calamities.

It is the duty of every one to become familiar with the weapons employed by modern sanitary science to combat epidemics of all kinds.

Third Lecture **Thursday Evening, November 4, 1926**

WHAT SHALL WE WEAR?

By Prof. Freeman P. Stroup, Ph. M.
Professor of Chemistry, Philadelphia College of Pharmacy and Science

Despite the Biblical injunction which tells us not to worry about these things, people are more or less concerned with the questions, "What shall we eat, what shall we drink, and how and with what shall we be clothed?" The first two have been discussed in previous lectures, and it is our intention now to discuss the last.

No attempt will be made to suggest either how much or how little material is needed to properly clothe the "female (or male) of the species," nor how it shall be put together. Opinions on these matters differ so much and change so frequently that there is apt to be a radical change between the time the lecture is written and the time it is delivered, and again before it shall have had time to appear in print.

Silk, artificial silk, cotton, linen and wool are the fibers which are most largely used in the making of fabrics for clothing men and women. These vary very much in some of their properties, their durability, their behavior toward dyes, etc. Simple methods for differentiating between them should be of interest to most people. How they are prepared for use will interest others. These and other things will be considered in the lecture. Lantern slides, fibers and fabrics, and lecture table demonstrations, will be used by way of illustration.

Fourth Lecture **Thursday Evening, November 18, 1926**

THE STORY OF BURNT CLAY

By J. W. Sturmer, Ph. M., Phar. D.
Dean of Science, Philadelphia College of Pharmacy and Science

Ancient pottery-bricks, tiles; modern manufacturing processes for earthenware, stoneware, china, porcelain and other ceramic products.

Specimens will be exhibited and there will be lantern slides.

Fifth Lecture **Thursday Evening, December 2, 1926**

SAND—FROM MOUNTAIN TO SEASHORE

By Edward J. Hughes, P. D.
Assistant Professor of Chemistry, Philadelphia College of Pharmacy and Science

Sand is produced by the weathering of feldspar and other rocks in the earth's crust. Chemically it is related to quartz, agate and certain beautiful gems.

Ever since the dawn of recorded history sand has been vitally concerned with the progress of mankind.

Whether it be in the pleasures of the seacoast, the perils of the desert or in the heart of the busy city, sand and its products may be found everywhere.

Many interesting phases of sand will be discussed in the lecture, which will be illustrated with experiments, lantern slides and specimens.

Sixth Lecture **Thursday Evening, December 16, 1926**

DUST

By Paul Q. Card, B. Sc.

Dusty roads, cosmic dust, occupational dusts and sea dust contribute much towards our progress and health. Dust is not only in the center of industry, but upon examination we find it surrounding nearly all industrial enterprises. Through it the dusty miller's occu-

pation becomes hazardous. The enormous energy released during a thunder storm, beautiful sunsets, and the life of plants that "live" on air, are under the control of dust. Fortunes have been made and lost in dealing with it. Nations have turned to it for help in time of war. Smoky cities have regained their natural beauty by electrical precipitation of the suspended soot. The lecture will be illustrated with lantern slides and lecture table demonstrations.

Seventh Lecture **Thursday Evening, January 6, 1927**

COLLOIDS

By David Wilbur Horn, Ph. D.

Professor of Physics and Physical Chemistry, Philadelphia College of Pharmacy and Science, Professor of Inorganic Chemistry, Wagner Free Institute of Science

The most familiar mass of colloids is the human body. Unless its colloidal character is properly respected, disaster follows. The protein of the cell—which seems to carry on the spark of physical immortality—is colloidal.

Simple properties of colloids will be demonstrated on the lecture table. Applications of colloids will be discussed.

Eighth Lecture **Thursday Evening, January 20, 1927**

THE ROMANCE OF THE OCCULT IN SCIENCE

By Charles H. LaWall, Ph. M., Sc. D.

Chemist to Food Bureau, Pennsylvania Department of Agriculture; Dean of Pharmacy, Philadelphia College of Pharmacy and Science

Magic, white and black, has played an important part in the history of the world.

Superstition and credulity have not yet been entirely displaced by scientific knowledge.

The Seal of Solomon, or the pentagram, is still to be found as a protective symbol on the gable ends of some Pennsylvania barns.

The nymphs and undines, gnomes and elves, sylphs and salaman-

ders of the days of Paracelsus, and the elementals of the Rosicrucians are not without their present-day believers.

What did Saul learn from the Witch of Endor? Did John Dee show Queen Eliabeth the impending fate of the Spanish Armada in his famous crystal ball?

The trail begins at that far away period when most people doubted nothing, and leads down to the present, when some people believe everything.

The lecture will not be illustrated with specimens.

Ninth Lecture **Thursday Evening, February 3, 1927**

"MY LADY NICOTINE"

By Ivor Griffith, Ph. M., P. D.
Assistant Professor of Pharmacy, Philadelphia College of Pharmacy and Science; Professor of Organic Chemistry, Wagner Free Institute of Science, Philadelphia

Tobacco—the "pernicious tawny weed," was publicly advertised by King James I of England as "a branch of the sin of drunkenness." By royal edict it was banned from merrie England. Thereupon its popularity increased. Poets of all ages have sung its praises. Byron called it "the sublime tobacco," and the melancholy Burton "divine and rare, a sovereign remedy for all diseases."

The lecture will cover the origin, history, uses and abuses of the drug and, having had the opinions of kings and poets, an effort will be made to present a sensible compilation of medical and chemical opinions concerning its vices and virtues.

The lecture will be illustrated with experiments and lantern slides.

Tenth Lecture **Thursday Evening, February 17, 1927**

EPOCHS AND EPOCH-MAKERS OF MEDICINE

By Horatio C. Wood, Jr., M. D.
Professor of Materia Medica, Philadelphia College of Pharmacy and Science

The progress of science is not a constant advance, but is marked by intermittent rapid developments due to great discoveries. This

lecture will describe some of the more notable epochs in medicine with an account of those chiefly responsible for, and the circumstances leading to, these critical discoveries.

Eleventh Lecture **Thursday Evening, March 3, 1927**

WHY THE WEATHER?

By George Rosengarten, Ph. D.
Instructor in Physics, Philadelphia College of Pharmacy and Science

Will it rain tomorrow? Probably it will be fair. This is a common topic of conversation and a more accurate knowledge of the facts pertaining to the prediction of the weather will enable one to appreciate the difficulties of the weather man.

The apparaus and methds used in determining the weather, as well as many of the phenomena that accompany the ever-changing conditions, will be explained by the lecturer.

The production of the Rainbow, the Northern Lights and the character of the lightning have always been a matter of interest. The importance of the wind and the rain to our struggle for existence or to navigation on the water and in the air, will be among the many interesting problems that will be considered.

The lecture will be illustrated with lantern slides.

Twelfth Lecture **Thursday Evening, March 17, 1927**

HORMONES—MYSTERIOUS AGENTS OF VITAL LIFE FUNCTIONS

By Arno Viehoever, Ph. D.
Professor of Biology and Pharmacognosy and Director of the Botanical Gardens, Philadelphia College of Pharmacy and Science

The discussion will comprise the work of peculiar chemical messengers, stimulating, even though only infinitesimal traces be present, the living apparatus of both plants and animals—affecting their growth, vitality and maturity.

The lecture will be illustrated with experiments and lantern slides.

Thirteenth Lecture **Thursday Evening, March 31, 1927**

MOSSES AND THEIR MESSAGE

By Marin S. Dunn, Ph. D.
Assistant Professor of Botany, Philadelphia College of Pharmacy and Science

Very little is actually known concerning this extremely interesting and well recognized plant division. That is no doubt the reason why not one member of this group is so important to medicine as to entitle it to a place in the book of medicinal standards, the Pharmacopœia.

The lecturer will discuss the following topics: (1) methods of classification, (2) distribution, (3) general structure, (4) typical life histories, (5) uses, (6) possibilities of the group.

The lecture will be illustrated by charts, specimens and lantern slides.

POPULAR SCIENCE LECTURES IN BOOK FORM

One Dollar for Each Volume

The volumes of Popular Science Lectures beginning with number four, the next volume, will be published from a fund established in memory of Mr. Thomas D. Simpson, of Philadelphia.

Three series of Popular Science Lectures have been published in book form, one series to each volume. The last series is now in press. There is thus rendered available, at very litle cost, a permanent record of all the lectures presented during the course. Proof of the popularity of these volumes rests in the fact that of the first two volumes very few are available of the original printing. High schools, public libraries and colleges are permanent subscribers to the volumes as they appear.

NEWS ITEMS AND PERSONAL NOTES

GOLDEN JUBILEE OF ERNST STAUFFEN—On October 20, 1926, at the Union League Club, New York City, at 7 P. M., the board of directors of Sharp & Dohme gathered together to celebrate the fiftieth anniversary of the entry of their vice-president, Mr. Ernst Stauffen, into the employ of Sharp & Dohme, which was founded in 1860 by Alpheus Sharp and Louis Dohme. In 1864 Charles E. Dohme entered as a partner, and in 1876 Ernst Stauffen entered as a bookkeeper and general helper as were most employees at that time. It is not often that it is vouchsafed to a man to remain fifty years continually with one concern. It was therefore a somewhat unusual and rare occasion that was being celebrated on October 20th.

Louis Dohme lived just long enough to complete his fiftieth year of service with his firm, but was not well enough to join in any celebration of the event. Charles E. Dohme lacked three years of attaining his golden jubilee. One employee, Hermann Sattler, celebrated his golden jubilee in 1923 and is still active in the service of Sharp & Dohme. Ernest Stauffen hale, hearty and vigorous at his golden jubilee gives promise of many years of active work with Sharp & Dohme.

Seven directors—Messrs. A. R. L. Dohme, E. Stauffen, E. Stauffen, Jr., W. A. Sailer, John D. F. Dreyer, A. Homer Smith and Eugene F. Wagner—sat down to enjoy with the celebrant of his golden jubilee the excellent banquet which included a large beautifully ornamented cake from which protruded fifty burning candles. As the fancy ices were being served the lights in the room were extinguished, the door opened and the chef entered bearing the fiftieth Sharp & Dohme birthday cake which he placed before Mr. Stauffen. After the dinner was over, the president of Sharp & Dohme, Dr. A. R. L. Dohme, rose and spoke for about half an hour of the history of Mr. Stauffen's life with Sharp & Dohme and conveyed to the guest of honor the esteem in which he had always been and was held by all his associates in the concern and what had been his achievements in bringing Sharp & Dohme up to the high and enviable position it occupies today in the drug trade of this country.

As an evidence of the esteem, high regard and love of all his associates in Sharp & Dohme Dr. Dohme then presented Mr. Stauffen

with a beautiful suitably inscribed gold watch in a specially designed leather case. Those present as well as the guest of honor were appreciably moved by the solemnity and sincerity of the occasion.

DAVID F. JONES PROFESSORSHIP ENDOWED—Dakota Wesleyan University, Mitchell, South Dakota, a well-known Methodist institution and one of the leading colleges of the state, has recently announced the creation of a professorship chair of chemistry, to be known under the title of the David F. Jones Professorship in Chemistry, in honor of its donor.

The endower, Mr. David F. Jones of Watertown, South Dakota, who has for the past twelve years served as one of the most active members of the University Board of Trustees, is nationally known in pharmaceutical circles as one of the leaders in advancement of ethical and scientific endeavor. This, combined with a deep interest in religious training, as evidenced by his years of work in the local church offices, are some of the factors which have led him to this charitable act. The new chair will greatly aid the furtherance of educational standards at the university.

Mr. Jones, who is prominent in both state and national pharmaceutical fields, is also a charter member of the South Dakota Veteran Druggists' Association.

SUPREME COURT UPHOLDS AMERICAN DRUGS—A decision of the highest importance to every physician, pharmacist, drug manufacturer and, in fact, every user of drugs in the United States was rendered by the Supreme Court of the United States on October 11, 1926, when this highest tribunal of the nation declared that the Chemical Foundation has been acting legally and properly in the purchase of the foreign drug and chemical patents, during the war, and licensing American manufacturers to produce these essential substances in this country.

The sale of the German patents to the Chemical Foundation took place during President Wilson's administration and had, without doubt, a distinct influence upon the outcome of the war, because this transfer permitted American concerns to begin at once the production of various drugs and chemicals which had, theretofore, been

made only in Germany, and whose importation ceased with our entry into the war.

Because of some misapprehension as to the purposes and functions of the Chemical Foundation suit was brought by the Government to set aside the sale of these patents to the Foundation.

The case was first tried in the Federal District Court of Wilmington, Del., and resulted, after weeks of evidence taking, in a finding against the Government on all points.

The case was appealed to the Circuit Court, which upheld the decision of the District Court in every particular.

A final appeal carried the question to the Supreme Court of the United States, where evidence was heard more than a year ago. The long delay in rendering a decision has afforded time for mature consideration. The Court has decided unanimously that the sale to the Chemical Foundation was valid and legal and that the Foundation has made no improper use of the powers which it thus acquired.

This decision is a momentus one for everyone who has anything to do with drugs and chemicals in any way whatever.

To the physician it means that he will have a steady and regular supply of reliable drugs, of American manufacturers, which can never again be upset or cut off by the vicissitudes of war. The same considerations apply to the pharmacists. Among the vitally necessary drugs affected may be mentioned the arsphenamines, cinchophen, barbital, the flavines, procaine and a host of others.

To the drug manufacturer, who has invested thousands of dollars in apparatus for the manufacture of drugs and chemicals under the Foundation's licenses, it means relief from a certain degree of anxiety (though the outcome of the case could scarcely have been in doubt) and a tremendous inspiration to further investigations looking to the production of more and better drugs and chemicals for America.

To the nation at large, it means that reliable medicines will continue to be sold at reasonable prices; and, more or less indirectly, that the dye industry of America which is now in a flourishing condition, thanks to the Chemical Foundation, will be available for government uses should we become involved in another war.

Nor are medicine and pharmacy the only lines of endeavor affected by this momentous decision. The steel and packing industry and many others will be vastly benefited by the freedom of chemical investigation and activity which is now assured them.

COLLEGE NEWS NOTES

Among the foreign students attending courses in the Philadelphia College of Pharmacy and Science this year are the following: Efrain Escalona of Los Santos, R. P., Juan C. Busigo, of Labana Grande, P. R., Miss Dorris Lo, of Hong Kong, China; M. Humberto Morales of Granada, Nicaragua, C. A.; Saburo Kitomura, of Osaka, Japan; Young Tong, of Honolulu; Domingo Villalaz, of Los Sante, R. of P.; Peter S. Wong, of Canton, China.

The Botanical Society of Pennsylvania, led by Dr. Harshberger of the University of Pennsylvania inspected the college botanical gardens on Saturday, September 25th. The gardens had been previously inspected by several groups during the meeting of the American Pharmaceutical Association. All of the visitors who have seen the gardens this year have expressed their gratification at finding such a variety of medicinal plants indigenous and foreign. Particular interest was shown in connection with the special experimental problems carried on in the cultivation of digitalis which is being made a subject of research by Dr. Viehoever's assistants and students.

Basketball candidates were called out for the first practice on Tuesday, October 12th, and about twenty-five prospective members of the team answered the call. The college will this year be represented as usual in the City College League. The games will be played at the Central Y. M. C. A. or at the hall at Thirty-sixth and Market Streets, University of Pennsylvania. The girls basketball team which was so successful during the latter part of last year has again resumed practice, and it is hoped that some matches will be arranged for them in the near future. Miss Ruth Brown is captain of the girls team, and R. Yingst is captain of the men's basketball team. Professor L. G. Cordier is the faculty director of athletics, and the coach. His assistants in this work are instructors John Kramer and George Malpass.

A reception and dance to the freshman students of the college was held in the auditorium on the evening of Friday, October 22d. Several members of Belov's Orchestra played concert and dance

music. Some very effective violin solos were played by Meyer Epstein, member of the freshman class, who was formerly connected with the Philadelphia Orchestra, and vocal solos were also rendered by Professor Nichols and Mrs. Stoneback, wife of Professor Stoneback. The program was opened by a very clever playlet which was produced under the direction of Mrs. A. S. Capwell, the college librarian. The play was very appropriately called "Getting Acquainted" and the characters were taken as follows: Jane Stewart, a spinster; Mrs. Capwell, Priscilla, her sister; Mrs. H. I. McConnell, John Prudy, a young man, Sara V. Shriner. Light refreshments were served. Dancing continued until nearly midnight.

The architect is now working on the last stages of the new college plans. A committee from the college has arranged to visit several prominent modern laboratories in the near future in order to familiarize themselves with some of the modern buildings devoted to college purposes. It is hoped that construction work will be begun in the early spring at the latest.

The first faculty dinner was held on Monday, October 25th, with about twenty-five present. The principal discussion of the evening was on symbolism in pharmacy which was led by Professor La Wall.

The broadcasting of the Popular Science lectures which in other years was done from Station WIP on the Saturday evening following the lecture, has now been changed to Station WFI at 3 P. M. on the Monday following the lecture. These lectures are continuing the success which have marked them in previous years. The publication of the lecture volume has now been endowed by an anonymous donor of funds for the purpose.

An inter-pharmacy college league has been formed of the basketball teams from Philadelphia College of Pharmacy and Science, New York College of Pharmacy, Brooklyn College of Pharmacy and New Jersey College of Pharmacy which will begin their schedule within a few weeks.

BOOK REVIEWS

FORTSCHRITTE DER HEILSTOFFCHEMIE. By Dr. J. Houben, a. o. professor University of Berlin. 1st part, Vol. 1, prepared by Dr. Houben, comprising the German patent records from 1877 to 1900. Large 8vo., xxi-992 pages, paper bound. Berlin and Leipzig. Walter de Gruyter & Co.

At first glance of this splendid volume one is reminded of Macaulay's remark about Nares' "Life of Lord Burleigh," in which he refers to the cubic contents and weight of the book as one of its most striking features. Nares' work owed its size and weight to the prolixity of the author and his lack of historical perspective, but Dr. Houben's book is not open to such criticism. It is made up of facts concerning the immense mass of research that Germans have been carrying on for more than half a century. It is to the constant cooperation of theory and practice that the wonderful results contributed by Germany to synthetic chemistry are due. The reviewer well remembers the lack of interest and even disapprobation with which chemists in Great Britain and France regarded the labors of German workers. In the middle of the last century, American chemists were largely dependent on foreign literature, especially British, for their education in the science and guidance in research. Fownes "Chemistry" was largely used as an elementary textbook and the *Chemical News* was the principal journal for current information. Analytical procedures were mostly guided by Fresenius' manuals. Naturally, little appreciation was felt for the recondite features of chemical theory. Even the modification of the atomic weight of oxygen, making it sixteen instead of eight, was slow of acceptance, and the substitution of such a formula as $CuSO_4$ for CuO,SO_3 was long resisted by many teachers.

Matters have changed a good deal for the better and the value of pure science in relation to the applied phases is now widely recognized. Works on coal-tar derivatives are especially products of Germans, for there the subject has been studied longer and more thoroughly than elsewhere. The volume in hand is devoted to the progress in patented medicinals, mostly synthetic, for which Germany has long been famous. Every American physician and pharmacist knows

the influence that these synthetics have had, not always, it must be confessed, agreeable, and in many cases, transient. Remedies come and remedies go, and out of the thousands that have fretted their hour upon the therapeutic stage, few remain of record except as an entry in the patent office.

The present work, the author tells us, has been prepared after a long-felt desire for a complete collection of data in connection with the chemistry of medicinals as expressed in the literature devoted to the subject. The marked tendency in modern medical science towards a chemo-therapeutic attitude has led to efforts to secure a knowledge of the intimate structure of all drugs, especially those of high potency. The large number of drugs produced during the last fifty years has materially aided such investigations, for modern synthetic methods are minutely understood; the chemist builds up the molecules almost as the artisan constructs a machine or a building. Through the illuminating quality of the modern theories of the fundamental structure of organic substances, we can proceed from simple to complex without losing track of any transformation. The results of such activities are found vividly expressed in the patent literature, since the commercial importance requires that the work done shall be suitably rewarded. There is, of course, some overlapping; many synthetics have other uses than as drugs. The author has sought to present the vast subject by means of a classification which will convenience those who use the book. The data comprises exclusively German patents, but these form the great bulk of the records.

The present volume which is the first part of the first volume includes only the patent records. The subsequent volume will deal with the individual substances. Aliphatic compounds will be first considered, being included in the second part of the first volume. These are divided into four groups: (a) hydrocarbons, halogen and thio-derivatives, alcohols; (b) oxygen-containing derivatives in general, such as aldehydes and acids, (c) compounds containing nitrogen, (d) isocyclic compounds such as terpenes and camphors. These last will conveniently carry the treatment over to material of the second volume in which the benzene series will be presented, leaving the heterocyclic derivatives for consideration in the third volume.

Elaborate lists of the abbreviations used and of literature consulted other than patent records are given. A cosmopolitan spirit

has always been marked in modern Germany as concerns the work being done in all departments of knowledge, and we are not astonished to find that an extensive consultation of scientific periodicals has been made.

The work is a monumental one and represents enormous and patient labor on the part of the author and all who assisted him. It is hardly likely that even in the prosperous condition of the United States, with its extensive development in the printing and publishing industries such a work would be attempted. Yet in glancing over the vast amount of material presented the thought arises as to what has been the harvest. Medical practice still relies mainly upon a few standard drugs: Arsenic, mercury, strychnine, quinine, iron and morphine. In the course of the last fifty years how many substitutes for morphine have been offered and how little have they affected the use of that wonderful alkaloid. Modern medicine is tending strongly to preventive methods and the recent advances in our knowledge of the effects of light tend to minimize the value of drug-giving. Notwithstanding these doubts, the book in hand is a wonderful piece of work and is a most valuable contribution to the literature of therapeutics.

HENRY LEFFMANN.

DER APOTHEKER ALS SUBJEKT UND OBJEKT DER LITERATUR. By Georg Urdang. vi-181 pages, 16 portraits. S 8vo. Julius Springer, Berlin. 9.60 mks.

This book falls into two parts, the first in which the literary activities of apothecaries are presented; the second presents the same as object of literary effort. The author has also written a book entitled "The Apothecary in the Mirror of Literature." This will probably be more interesting to readers outside of Germany for, from some notes, it appears that a wider range of selection has been applied than in the present volume, which concerns German literature very largely. The first book appeared in 1921, the present one contains material from the intervening period, so that the contemporaneous expressions are collated. With one exception (noted below) the biographies are connected with Germans. The material available concerning those who practice the profession of pharmacy is probably

much greater in Germany than in English-speaking nations, hence it is easier to make an attractive narrative. In England, a pharmacist is regularly termed a "chemist" and an American chemist would have to distinguish himself as an "analytical chemist" in order not to be mistaken by his British friends as one who kept a drug-store, what in London they call a "chemist's shop."

The book is written in a pleasant style, but the type is German text, which makes hard reading for the non-German. This style of letter, that Whitney appropriately called the "product of the perverse ingenuity of the monks of the middle ages" has fortunately been abandoned by the writers and publishers of scientific literature, but still holds much sway in the popular literature of Germany, probably largely due to chauvinistic tendencies, which have been exaggerated by the late war. Yet a book of the class of the one in hand is not read by peasants or humble city people and might have been put in the clear type. The inclusion of Ibsen is striking, but it appears that he began his active life as an apothecary in Grimstad and was occupied with this work for six years. It seems, however, that the life of the pharmacist or physician can yield but a small harvest of interesting material. As a rule their lives are too restricted. Apart from the men of great genius in literature, such as the poets, dramatists and fiction writers, lawyers, politicians and soldiers usually carry off the world's honors.

HENRY LEFFMANN.

UNITED STATES DISPENSATORY, TWENTY-FIRST EDITION—Thoroughly revised, largely rewritten and based upon the Tenth Revision of the U. S. P., National Formulary, Fifth Edition and the British Pharmacopœia, 1914. By Horatio C. Wood, Jr., M. D.; Charles H. LaWall, Ph. M., D. Sc., Phar. D., with the collaboration of Heber W. Youngken, Ph. M., Ph. D.; John F. Anderson, M. D., and Ivor Griffith, Ph. M. Published by J. B. Lippincott Company, Philadelphia, Pa. Price,

The United States Dispensatory is not merely a book; it is an institution. How absolutely necessary a part it is of the proper equipment of all who have anything to do with the prescribing, manufacturing, dispensing or sale of drugs and medicines is well attested

by the marks of daily usage to be found on the individual volumes in libraries or on office and prescription department shelves.

A part of the training of a pharmaceutical apprentice is to learn where and how to look up needed information. One of the first sources that most of us have tackled along this line is the U. S. Dispensatory. The familiarity of its users with the form and mode of presentation of the subject-matter makes it necessary for the revisers to retain this form as far as possible although the subject-matter may be completely revised. This has been done in the present edition. That the subject-matter has been brought up to date is evident on every page. Not only have the monographs been revised to conform to new editions of the U. S. P. and N. F., but they have been made as informative on new developments as possible. One detects excellent judgment in the statements of the therapeutics as well as chemical properties of the items listed. The Dispensatory has been frequently resorted to for the purpose of establishing therapeutic claims for proprietary and other products. It is evident that the authors have realized this and have clothed their statements with the necessary qualifications and with references to original sources.

There is so much of valuable information in this monumental work that one can hardly review it completely in the space allotted for the purpose. Nor would it be just to select one or two isolated items from among thousands, for criticism and have the work as a whole judged thereby. Accordingly, we shall confine ourselves in this review to recording a few impressions resulting from a rather careful examination of the new edition.

In the introductory section one looks in vain for the old familiar list of therapeutic terms and definitions as well as for the list of remedies under the heading of various ailments. Perhaps the advantages of this omission outweigh the disadvantages but constant users of the book will turn with reluctance to other sources for the information because it will mean going through several volumes to find what was compactly stated there in former editions.

The Food and Drugs Act and the Harrison Act are given in full but regulations under the former are given only in part and not at all under the latter. While the competition for space among various features of this work is undoubtedly great, it seems that if it was deemed sufficiently important to include these laws, the regulations, which are most important, might also have been included.

Since it is important in a book of this kind to save space, one is apt to wonder why it is considered necessary to include long dissertations on the various classes of preparations such as extracts, fluidextracts, ointments, suppositories, etc. This is all matter that is well covered in pharmacy texts and could give way to more information of the encyclopædic type, if any of it had to be omitted, or to decreasing the size of the book. On the other hand one must welcome the lucid explanation of biological assays and rejoice that space has been found to explain the terminology of the U. S. P. in connection with drugs and preparations requiring such assays. The authors have here performed a real service for there are few terse and readily available sources of information of this character open to the pharmacist and physician who started practicing before such assays were generally accepted.

Formulas in this edition are given only in the metric system and not in both metric and apothecaries' as was the case in previous editions. This is in line with modern progress and should help the aim of making the use of the metric system universal in medicine and pharmacy. Temperatures are given in centigrade only. Doses are given in both metric and apothecaries' units.

For a work of its size, the Dispensatory is remarkably free from typographical errors. The bibliographical references are accurate and recent. The index is good but it could be improved in some respects. Any publisher may be excused for feeling that 101 pages of index ought to cover the contents of a 1691-page book, but the nature of the information in this work is such that it should be made as easily available as possible. Undoubtedly, nearly everything has been indexed but the saving of time, to those who search for information, is made when they can be sure that "if it isn't in the index, it isn't in the book." Such dependability requires careful cross-referencing. But—all these are minor considerations when compared to the excellence of the accomplishment as a whole. The authors—from the scientific and practical side and the publishers—from the mechanical side have produced for us another edition of the most valuable single volume that rests in a pharmaceutical library. The U. S. D. 21 is indeed a worthy successor to its long line of ancestors.

R. P. Fischelis.

J. F. Bergmann Verlag, Trogerstr. 56, München, the well-known publisher of chemical, medical and pharmaceutical texts, submitted the two following books for review:

GRUNDZÜGE DER PHYSIKALISCHEN CHEMIE IN IHRER BEZIEHUNG ZUR BIOLOGIE. Von S. G. Hedin, Professor der med. und physiol. Chemie, Universität Upsala. 2 Auflage. Lex. 189 pp. Mk. 7.50.

Hedin, the successor to the immortal Hammarsteen, one of the masters of medical and physiological chemistry, presents here in second edition a volume of great interest. The book is divided into the following five chapters: I. Osmotic Pressure, II. Colloids, III. Reactions, IV. Enzymes, Antigens and Antibodies, V. Action of Ions und Salts.

As customary in a scientific work of this kind, it abounds with bibliographic references, *f. i.*, as many as twelve on page 72. A very complete index in three columns concludes this excellent book. The Subject Index occupies two pages and the Author's Index four pages. We find therein the names of research workers of all nations including our own. The late Jacques Loeb alone is quoted ten times.

All interested in physiological chemistry should read Hedin's book!

PRAKTIKUM DER FÄRBEREI UND FARBSTOFFANALYSE. Von Dr. Paul Ruggli, Professor, Universität Basel. 197 pp., Cloth, Mk. 12.

Just off the press is a practical handbook on Dyeing and Analysis of Dyes. The first part of the book, occupying 160 pages, classifies the different dyes and mordants and then treats the dyeing of wool, silk, cotton, other fibers and also of leather and fats. The second part of the work is devoted to the qualitative and quantitative analysis of dyes in powder form, in paste and in solution. One chapter is also devoted to the determination of the constitution of azodyes. To Chapter II there are also eighteen tables appended for the analysis of dyes. Sixteen illustrations help to elucidate the text.

It is just the book for the chemist and pharmacist who wishes to become better acquainted with this subject!

OTTO RAUBENHEIMER, Ph. M.

PRACTICAL PHYSIOLOGICAL CHEMISTRY. By Philip B. Hawk, M. S., Ph. D., President of the Food Research Laboratories, Inc., New York City, and Olaf Bergeim, M. S., Ph. D., Assistant Professor of Physiological Chemistry in the University of Illinois, College of Medicine, Chicago, Ill. Ninth Edition, Revised and Enlarged. With Two Full-Page Plates of Absorption Spectra in Colors, Six Additional Full-Page Color Plates and Two Hundred and Seventy-three Figures of Which Twelve are in Colors. P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia, Pa. Price, .

The new Hawk is as up to the times as were its previous editions. There is beside the reviewer at this writing a copy of the sixth edition, done in 1914, and representing in the number of its pages just one-half (475: 931) of this new edition. Yet the writer recalls that the sixth edition when it appeared was a representative cross-section of the then available methods, theories and conclusions resulting from the labors of the leading biochemists of the world.

And so also is the present volume. Except for the rather formidable full-page plates of absorption spectra (which might be better inserted at the end of the volume) and a few figures "of which twelve are in colors"—there are very few parts to the book that have not been completely revised and changed in order to bring the work to date.

It is not feasible to mention specifically each new feature which goes to make up the general excellence of the volume. However, a brief mention of the new chapters and sections will serve to indicate the character of some of the more important lines of revision.

Seven new chapters have been included in this new edition, four of them covering subjects not heretofore considered in this book. The new chapters are:

Chapter I.—"Physical Chemistry of True and Colloidal Solutions."

Chapter XIV.—"Absorption."

Chapter XV.—"Putrefaction and Detoxication."

Chapter XVIII.—"The Chemistry of the Blood. Tissue Analysis."

Chapter XIX.—"Respiratory Metabolism and Neutrality Regulation."

Chapter XX.—"The Endocrine Organs."

Chapter XXI.—"Energy Metabolism."

Chapter I includes understandable discussions of physicochemical procedures of importance in biochemistry.

Chapter XIV contains a discussion of the intestinal absorption of the various food elements, together with newly elaborated experiments on the subject.

Chapter XV includes a review of the various types of putrefaction products and the chemistry involved in their detoxication in man and the lower animals. Among the experiments is given Bergeim's procedure for the estimation of intestinal reductions.

Chapter XVIII includes a revised table of normal variations of blood constituents with pathological changes, and a discussion of the importance of blood chemistry.

Chapter XIX includes a consideration of acid-base balance founded on the modern physico-chemical conception of the hydrogen ion concentration of buffer solutions and the physiological mechanisms brought into play for its regulation. Complete details of *manometric methods* of gas analysis, including urea in urine (unpublished to date) are also given.

Chapter XX contains a brief survey of the chemistry of the various hormones, with experiments on their preparation, determination and physiological effects. A hitherto unpublished illustration of adrenaline crystals is included.

Chapter XXI includes a survey of basal metabolism, embracing clinical interpretation, normal standards, methods and calculations.

In addition to these new chapters the revision has included the introduction of nine new sections of importance. These embrace:

"Oxidation and Reduction Systems," included in Chapter II.
"Photosynthesis," included in Chapter III.
"Amino acids," included in Chapter V.

"The Normal Gastric Response to Standard Foods," included in Chapter VIII.

"Dietary Deficiencies and Vitamins," including "Vitamin Assays" and "Color Reactions" in Chapter XXXII.

"Ultraviolet Radiation," included in Chapter XXXII.

"Rickets," included in Chapter XXXII.

"Ketosis," included in Chapter XXXII.

"Manipulatory Procedures" in Metabolism Experiments, including "Cowgill's Procedure for Metabolism Experiments on Dogs," included in Chapter XXXII.

The rearrangement, rewriting and expanding of the final chapter on *Studies in Metabolism* will make this chapter particularly useful to those interested in this important field of biochemistry.

The printing and general assembly of the book are excellent. A great many illustrations add to its teaching value. It may be correctly stated that this book is today, as it always has been, the outstanding work of its kind in this country.

IVOR GRIFFITH.

BENJAMIN FRANKLIN, THE FIRST CIVILIZED AMERICAN. By Phillipps Russell. Profusely illustrated. 323 pp. Cloth, $5. Brentano's, 1 West Forty-seventh Street, New York City.

Why this subtitle? Because at an American period of narrowness, superstition and bleak beliefs, Benjamin Franklin was mirthful, generous, open-minded, learned, tolerant, and humor-loving, and because he was the first American man of the world in the sense that he was the first American world-man. Therefore the title!

The book before us disregards none of the known facts but corrects many erroneous beliefs regarding the life, principles and career of a man who was in many respects the most interesting of all the Founding Fathers. It presents new evidence as to how greatly America is indebted to Franklin, who served his country sagaciously and unflinchingly in some of the most trying moments.

In science Benjamin Franklin's name will live forever as the discoverer of the identity of lightning and electricity by the celebrated "kite experiment" performed on a June afternoon of 1752, in a pasture near what is now the corner of Fourth and Vine Streets, Phila-

delphia. The well-known allegorical painting of this incident by Benjamin West is reproduced on page 24. Among the numerous other illustrations I beg to point out the following: Portrait of Benjamin Franklin, List of Books for the Philadelphia Library in Franklin's Handwriting. The Pennsylvania Gazette; Diogenes Discovering Franklin; Statuette of Franklin by Nini. Brick Pillar marking Franklin's Grave and High Street, now Market Street, Philadelphia.

It might be of interest to pharmacists to learn that under Benjamin Franklin as secretary, the board of managers in May, 1754, appointed Jonathan Roberts as apothecary to fill prescriptions (see "The Beginning of Pharmacy in America," by Martin I. Wilbert in Am. J. Pharm., 1907, 400).

The printer-philosopher Benjamin Franklin has left the impress of his genius on practically every phase of our present-day existence. The book before us in highly interesting and also educational and is of special service to members of the medical and pharmaceutical professions. We wish the work the best of success!

Otto Raubenheimer, Ph. M.

A Doctor's Memories. By Victor C. Vaughan. Octavo, 464 pp. Illustrated. Cloth $5. The Bobbs-Merrill Co., Indianapolis and New York.

For nearly half a century Dr. Victor C. Vaughan has been a leader among the medical and other professions of this country. For thirty years he was Dean of the University of Michigan Medical School which he succeeded in building up to a great institution with its present importance. He is our greatest authority on epidemics. His work on the commission that investigated the typhoid epidemic during the Spanish War and the pneumonia epidemic during the World War was of enormous value. His Spanish War experience brought him close to Walter Reed and Gorgas and his World War experience put him in touch with Gorgas again, with Braisted, Blue, Martin, Welch, Simpson, Grayson and Mayo.

In this chatty and charming autobiography Dr. Vaughan tells of his boyhood in Northern Missouri, of his education and his work as an educator; of the many men and women prominent in the world of science and culture, and war and politics with whom he was

brought in contact; of the life of a practising physician and the experiences of a medical expert on the witness stand.

This is a book, written in a pleasant style, which should have a wide sale not only among physicians and scientists but also among pharmacists, who take an interest in the profession.

OTTO RAUBENHEIMER, Ph. M.

DRUG STORE BUSINESS METHODS. A Textbook on Commercial Pharmacy. By Charles W. Pearson, A. B., M. B. A. 12 mo. 296 pp. Cloth $2.75. Lea & Febiger, S. Washington Square, Philadelphia.

The author who is associate professor of commercial pharmacy at the Massachusetts College of Pharmacy, intends this text primarily for courses in commercial pharmacy in the colleges. The general reader and quite especially the retail pharmacist will find the chapters on salesmanship, advertising and store management of special interest.

The book is divided into the following parts: I. Salesmanship, 6 chapters; II. Advertising, 7 chapters; III. Accounting for Retail Drug Stores, 10 chapters; IV. Business Law, 12 chapters and V. Store Management, 10 chapters.

A six-page, double-column index concludes this excellent book which we can highly recommend to both proprietors and clerks.

OTTO RAUBENHEIMER, Ph. M.